

November 24, 1992

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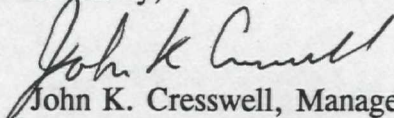
Ms. Cathy Amoroso
US EPA Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Cathy:

Enclosed is a copy of the Preliminary Assessment Report for the Nucor Steel Site (SCD 044 940 369). This site has been given a "High Priority".

If you have any questions please call me at (803) 734-5200.

Sincerely,



John K. Cresswell, Manager
Site Screening Section
Bureau of Solid and Hazardous Waste
Management

JKC/dps



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10705970

Approved 6/16/93
Cathy M. Voss
SI - High priority

**PRELIMINARY ASSESSMENT REPORT
NUCOR STEEL SITE
SCD 044 940 369**

Prepared by : Donna Sightler
Reviewed by: *Craig Orke*
Site Screening Section
Bureau of Solid and Hazardous Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Date Completed: November 24, 1992

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I. SCOPE OF WORK

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, a Preliminary Assessment of the Nucor Steel site has been conducted by the South Carolina Department of Health and Environmental Control (SCDHEC). The scope of this investigation included a review of SCDHEC files, demography, geology and topography of the area, and conversations with persons knowledgeable of the site to assess the threat to human health and the environment. The principle purpose of a Preliminary Assessment is to determine whether further investigation is needed under the Federal Superfund Program. A field investigation is not normally conducted by the Site Screening Section during the Preliminary Assessment and has not been conducted at this site. Any recommendations or conclusions of this report are tentative and subject to the concurrence of the US EPA.

II. INTRODUCTION

Nucor Steel Company began operations in 1969 as a scrap steel manufacturer. The plant processes scrap steel into steel products such as angle iron, rounds, channels, and flat bars. The property occupies approximately 230 acres, and is bounded on the northeast by Black Creek and to the southwest by Lucas Creek. Perennial bodies of water are located within the site. These are referred to as Nucor Creek, Swamp, and Pond.

Nucor generates both hazardous and nonhazardous waste materials. The hazardous waste generated include emissions control dust, and spent varsol from degreasing operations. ~~The nonhazardous~~ wastes generated include waste oil, scale, slag, sludge, and skulls. Several sludge piles are located on the plant site. Nucor operates a wastewater treatment system for sanitary wastes. Nucor operates two contact and two non-contact cooling water ponds. Nucor also has a on-site landfill, which is permitted by SCDHEC as IWP-208.

Soil samples have been taken at the site. The soil is impacted by concentrations of arsenic, chromium and lead. The potential exist to be exposed to hazardous substances in the soil on-site. The groundwater samples taken at the site indicated concentrations of arsenic, chromium, lead, copper, and nickel. There is also the potential for exposure of hazardous substances on-site.

Adjacent to Nucor's property is an off-site emissions control dust disposal area. Soil samples have been taken from this area. The soil is impacted with zinc and lead. Zinc concentrations were detected in the soybeans and weeds surrounding this off-site disposal area. No groundwater monitoring has occurred to assess the impact of this area. It is recommended that soil and groundwater samples be taken from this off-site disposal area.

About 975 people use private groundwater wells within four miles of the site. Fishing probably occurs on Lucas Creek and the pond constructed on it, and on Black Creek. Two endangered plant species are found within 4 miles of Nucor Steel. Wetlands are located on both Lucas Creek and Black Creek. The sampling taken from Nucor has indicated concentrations of arsenic, chromium, lead, copper, and nickel. However, no surface water monitoring has been done. there is a high potential for surface water to be impacted from the site. Impact in the wetlands and fisheries is probable; therefore, Nucor Steel is given a "High" priority for a Site Screening Investigation (SSI).

III. SITE BACKGROUND AND HISTORY

A. Ownership History

Off-Site Disposal Area

Present Owner/Operator:

Mr. & Mrs. J.C. Jernigan
Darlington, S.C. 29532
(803) 393-3747

Nucor Steel Corporation
P. O. Box 525
Darlington, S.C. 29532

Contact: Mr. Wally Postlethwait
(803) 393-5841

Previous Owner/Operator: None

B. Description and Setting

The Nucor Steel Company is approximately 5 miles north of Darlington, South Carolina on Dovesville Highway (US 52). The site coordinates are 34° 22' 20" N Latitude and 79° 53' 45" W Longitude (Ref. 2). The Nucor site occupies approximately 230 acres on the eastern side of U.S. Highway 52. Prior to the construction of the facility approximately 20 years ago, the property was used for agricultural purposes. The property is bounded on the northeast by Black Creek and on the southwest by Lucas Creek (Ref. 4).

Nucor began operation in 1969. Nucor has 475 to 500 employees (Ref. 3). The facility has a guard shack, substation, warehouse, unloading station, main office, maintenance shop, cafeteria, four cooling ponds, one holding pond, old and new melt shops, on-site landfill, and the main plant area (Ref. 21). Nucor receives steel scrap at the plant by rail and truck and stockpiles it for future use. The steel scrap is transferred to charging buckets to be melted (Ref 5).

Nucor has an on-site landfill that is approximately 380 feet long x 85 feet on the northeastern corner of the plant site. The north, south and east sides of the fill area are bounded by old equipment storage areas, while the west side is bordered by an open slag processing facility. No buildings are situated adjacent to the landfill area (Ref. 6, 22). Aerial photos indicate large piles of slag and sludge in the area near the landfill. These appear to cover approximately the same size area as the landfill.

The cooling water ponds occupy approximately 100 feet (Ref. 27). These ponds drain to Nucor Creek, Swamp, and Pond, located on Nucor's property. Nucor's pond is shown on site drawings as a wetlands (Ref. 27).

Adjacent to Nucor's property is a scrap handling company (Ref. 3). Also, adjacent to Nucor's property is an off-site emissions control dust disposal area. The owners of this property live there in a trailer. There is a soybean field surrounding the off-site disposal site area.

C. Regulatory History/RCRA Summary

Nucor has an NPDES Permit No. SC00035238, to discharge cafeteria and sanitary wastewater to Lucas Branch (Ref. 9). Consent Order 86-86-W, was issued October 8, 1986, because Nucor consistently failed to achieve compliance with required NPDES permit limits. Nucor has been issued several Consent Orders for excessive air emissions (Ref. 10).

A notification of Hazardous Waste activity form was submitted to SCDHEC on December 17, 1979. But the company withdrew their notification on September 8, 1992. Nucor is currently listed as a generator of bag house dust, and varsol solvent waste (Ref. 20, 23).

Nucor has been given a three month extension on the existing landfill IWP-208. Nucor is pursuing a new on-site landfill (Ref. 7). On July 26, 1991 Nucor submitted an applications for a permit to construct (Ref. 8). If constructed, the new landfill should be able to remain open for approximately another ten years (Ref. 24).

D. Process and Waste Disposal History

Nucor is an industrial facility that processes scrap steel in the manufacture of steel products such as angle iron, rounds, channels, and flat bars (Ref. 4). Nucor also receives some steel from a scrap handling plant adjacent to Nucor's property (Ref. 3). In manufacturing steel, Nucor utilizes areas designated as the Old Melt Shop and the New Melt Shop that consist of electric arc furnaces. The facility contains other furnaces that may be fired with natural gas or propane (Ref 5). The final product is rolled low carbon steel in various shapes. Approximately 475,000 tons of steel are produced in rolled form (Ref. 5).

Because of Nucor's high demand for water, process water is supplied by 200 foot deep on-site wells. Potable water is supplied by the City of Darlington. Because sewer utilities are not available, Nucor operates a wastewater treatment system for sanitary wastes. Treated wastewater from this system is discharged to Lucas Creek under NPDES permit number SC0035238 (Ref. 4). The treatment plant has a design capacity of 10,000 gpd (Ref. 9).

Nucor operates two contact-cooling water ponds that apparently recirculate water to the rolling mills. Water is pumped from the ponds to cool the rolling equipment. The water, along with dirt, mill scale, and grease residue, falls into canals under the milling equipment and is gravity fed to a 40' sump. The grease residue and water is pumped from the sump through the cooling pond where some of the grease residue settles. Water and remaining grease residue then goes back into the mill completing the cycle. Every couple of days, sludge in the sump is cleaned out with a clam shell bucket. Approximately every six months, grease residue in the cooling water ponds are emptied through a pipe to a concrete-lined holding basin located near the landfill (Ref. 17). There are also periodic discharges from the cooling water ponds due to overflow. Until recently, the water and sludge was piped to a creek that flows to an area known as Nucor Swamp, which empties into Nucor Pond. Since August 1990, Nucor has diverted this flow to an open-top, in-ground concrete-lined holding tank located near the landfill (Ref. 4).

The waste products that Nucor produces are slag, sludge, sculls, emission control dust, and baghouse dust. The slag, composed of impurities removed during smelting, is processed on-site by a contractor for use as road surfacing material. The sludge material is composed of scale, slag and lubricating oil (Ref. 4). Sculls, composed of steel and slag, are the solidified residue which forms on the inside of the ladles used to hold and pour the molten steel during the steel manufacturing process. These sculls are either recycled in the steel manufacturing process or processed on-site along with the slag for use as road surfacing material. The emission control dust, the slag, scale, sludge and sculls were formerly used as fill material at the site (Ref. 4, 26).

The emissions control dust was also disposed of off-site in a soybean field. Soil samples were collected in 1991 by General Engineering Lab for Nucor. Two disposal areas were observed where emission control dust on the surface had apparently formed small nuggets. The subsurface soils collected at a depth of four feet contained grey dust fines, indicative of emission control dust. Laboratory analysis of the surface soil samples detected elevated concentration of arsenic, cadmium, chromium, copper, lead, nickel, and zinc in the soils. With the exception of arsenic, these same metals were also detected at elevated levels in the soils collected at a depth of four feet (Ref. 4). Apparently, the area downgradient of the disposal site was devoid of vegetation for approximately 75 feet. Weeds collected more than 75 feet away had elevated levels of zinc (Ref. 4).

Samples of slag, scale, sludge and emission control dust were found to contain significant concentrations of arsenic, copper, cadmium, chromium, lead, nickel, and zinc as shown in Table 1 (Ref. 4).

Table 1
Metal Concentrations in ppm

<u>Metal</u>	<u>Background Samples</u>	<u>Slag</u>	<u>Scale</u>	<u>Sludge</u>
Arsenic	3.1	3.2 ppm	26.0 ppm	43.0 ppm
Cadmium	0.5	1.6 ppm	13.0 ppm	20.0 ppm
Chromium	13.0	170 ppm	360 ppm	470 ppm
Copper	5.2	67.0 ppm	1700 ppm	2300 ppm
Lead	6.4	32.0 ppm	35.0 ppm	45.0 ppm
Nickel	6.1	26.0 ppm	300 ppm	530 ppm
Zinc	35.0	300 ppm	120 ppm	100 ppm

A SCDHEC inspection on March 13, 1984 found Nucor did not have waste piles of emissions dust, a RCRA hazardous waste, on an impermeable base. Nucor has since installed a concrete holding area with a cover and run-off control. The emissions dust is removed within 90 days (Ref. 13).

The bag house dust, office waste, wood pallets that are generated as solid waste are disposed of by commercial haulers (Southern Waste). The dust hauled is from the plant's bag house filters. These filters remove the particulate matter from the steel making process. The material is stored in 40 cubic yard containers and hauled to the Darlington County Sanitary Landfill. The baghouse dust is mostly iron oxide at an estimated 12,000,000 lbs/year (Ref. 11).

IV. GROUNDWATER PATHWAY

A. Regional Hydrogeology

The aquifers of concern include the Terrace Deposits and the Black Creek Formation. Regional hydrogeologic data indicates that the Black Creek Formation overlies a confining unit that likely restricts the downward vertical migration of groundwater into the Middendorf Formation. The referenced facility is not in an area of karst topography (Ref. 1).

Water levels in on-site wells indicate the depth to groundwater across the site is between 1 and 25 feet. The predominant shallow groundwater flow direction appears to be to the northeast towards Black Creek. However, water-level data from monitoring well MW-1 indicates that shallow groundwater beneath the southwestern portion of the site may be flowing to the southwest towards Lucas Creek (Ref. 1).

A well inventory within the four-well site radius indicates the following uses of groundwater from the aquifers of concern: industrial, livestock, domestic and public water supply. No alternate, readily available, unthreatened sources of groundwater exist within the four-mile site radius (Ref. 1).

The net precipitation for this area of South Carolina is between 5 and 15 inches a year (Ref. 19).

B. Groundwater Use

The City of Darlington has four supply wells, but they are all below the Middendorf confining unit. The nearest public well to Nucor is 600 feet deep (Ref. 26). The source of drinking water for most residents within four miles of Nucor Steel is the City of Darlington Water Systems (Ref. 14). Those residents not on public water lines are assumed to use private groundwater drinking wells. These are estimated by counting houses shown on USGS Topographic Maps in areas not served by public water lines. The following table estimates the number of wells and population data for groundwater use within four miles of Nucor Steel Company. Based on the topographic map, the nearest drinking water well is less than 1000 feet to the southwest (Ref. 2). Darlington County has an average of 2.76 persons per house (Ref. 25).

TABLE II: Groundwater Use Within Four Miles of Nucor Steel		
RADII (miles)	PRIVATE SUPPLY	
	Wells	Population
0 - ¼	7	6
> ¼ - ½	6	17
> ½ - 1	16	41
> 1 - 2	82	179
> 2 - 3	113	232
> 3 - 4	210	500
TOTAL:	353	975

C. Groundwater Impact

The analytical results for the groundwater samples collected by General Engineering Laboratories indicated concentrations of arsenic, chromium, lead, copper, and nickel. Filtered groundwater samples detected concentrations of arsenic and lead above their respective MCLs. Unfiltered samples taken from MW-5 were impacted with copper and nickel. Filtered samples taken from MW-5 were impacted with arsenic and lead. Concentrations of metals above General Engineering Laboratories background levels were detected in the groundwater samples collected from monitoring wells MW-3 through MW-10 (Ref. 4).

Also, during the preliminary assessment by General Engineering Laboratories, elevated concentrations of heavy metals and total petroleum hydrocarbons (TPH) in surface and subsurface soils were detected at the site. In the vicinity of a former cooling water pond groundwater was impacted with arsenic, lead and possibly chromium. Groundwater collected from MW-7 detected chromium (Ref. 4).

V. **SURFACE WATER PATHWAY**

A. Regional Characteristics

Nucor Steel is on approximately 230 acres in the Middle Coastal Plain Physiographic Province of South Carolina. The site is bounded to the northeast by Black Creek and to the southwest by Lucas Creek (Ref. 4). Neither Lucas or Black Creek water flows are measured within 15 miles downstream of the site. This area of the state averages about 1.3 cfs per square mile of drainage basin. Lucas Creek drains approximately 6 miles so it's flow can be estimated as 7.8 cfs. Black Creek has a gaging station at Hartsville, approximately 20 miles upstream. Flow there averages 226 cfs. There is no more than 100 square miles of drainage basin between Hartsville and the site, so Black Creek probably averages no more than 400 cfs. (Ref. 2). The two-year 24-hour rainfall for the center of Darlington County is 3.80 inches (Ref. 18).

General Engineering Laboratories refers to a "Nucor Creek" and a "Nucor Pond" within the site boundaries; however it is not known whether these are perennial water bodies. "Nucor Pond" is shown as a swampy area (Ref. 4).

B. Surface Water Use

No surface water intakes are located within 15 miles downstream on the Black Creek (Ref. 15). No surface water is used for irrigation of food or forage crops within 15 miles downstream. (Ref. 2). Fishing probably occurs on Lucas Creek and the pond constructed on it, and on Black Creek.

Two endangered plant species are found within 4 miles of Nucor Steel. Kalmia Cuneata, "White Wicky", a plant of national concern is located approximately 1.94 miles east-southeast on Black Creek. Isoetes Virginica, "Virginia Quillwort", is a candidate for federal review. "Virginia Quillwort" is located approximately 1.62 miles east-southeast on Black Creek (Ref. 2,16). Lucas Creek has .5 miles of wetlands. Black Creek has 5.5 miles of wetlands. Nucor pond is shown as wetlands on-site.

C. Surface Water Impact

A preliminary site assessment by General Engineering Laboratories, conducted in August 1990, identified elevated concentrations of heavy metals and total petroleum hydrocarbons (TPH) in surface and subsurface soils at the site (Ref. 4). Soil borings were constructed adjacent to Nucor Creek where the surface soils were visually impacted from sludge contained in the discharged contact cooling water. No samples were collected in Nucor Creek.

During a site visit to Nucor, SCDHEC District personnel noticed dead trees downstream of Nucor's property line adjacent to Lucas Creek. It is unknown why these trees have died, but it may indicate an impact from the concentrations of metals.

The site has a high probability of impacting both the wetlands and fishing pond along Lucas Creek. Because of its greater flow, Black Creek may be less threatened. Sampling of both creeks is recommended.

VI. SOIL EXPOSURE/AIR PATHWAY

Soil contamination is documented at the Nucor Steel site. In the early-to-mid-1970's, certain waste by-products from the mill operations had been deposited on and near the mill site. (Ref. 26). Nucor used some emission control dust as a fill material at the plant site until the mid-1970's. Laboratory analysis of the surface soil samples detected elevated concentration of arsenic, cadmium, chromium, copper, lead, nickel, and zinc in the soils. Also, surface soils taken of the emission control dust disposal area off-site revealed high concentrations of lead and zinc (Ref.4). It is unlikely that anyone other than Nucor's employees will come in contact with the contaminated soil on-site because Nucor is surrounded by a fence and has a guard to control access.

It is not known whether there are controls to access in the area where emission control dust was deposited off-site. It is likely that only a small population would come in contact with this waste. For purposes of this report, the trailer shown on the General Engineering Laboratories maps is assumed to be within 200 feet of the contaminated area.

Air Pathway

There have been no monitoring data to show a release to the air. However, it is likely that airborne particulate transport of hazardous substances may occur at this site. Large areas of contaminated soil, dried sludge and slag piles, emission dust, and emission control dust may be susceptible to blowing wind.

Because of Nucor's rural location, the population most likely exposed because of the blowing dust are the approximately 500 workers at Nucor Steel. The wetlands and endangered species along Black Creek may have minor impacts.

The total population within the four mile radius determined using 1990 US Census tract information is depicted below.

TABLE III

Population information within four miles of Nucor Steel Company (Ref. 2).

Radii (miles)	Darlington County
0 - .25	59
.25 - .5	115
.5 - 1	261
1 - 2	1019
2 - 3	845
3 - 4	3823
TOTAL	6122

VII. CONCLUSIONS AND RECOMMENDATIONS

Nucor has approximately 500 employees that may be exposed to contaminated soil, and hazardous substances becoming wind blown on-site. Soil samples taken at the site indicated concentrations of arsenic, chromium and lead. The potential exists for exposure to hazardous substances in the soil on-site. Nucor generates both hazardous and nonhazardous waste materials. Several sludge piles are located on the plant site. Nucor operates a wastewater treatment system for sanitary wastes. Nucor operates two contact and two non-contact cooling water ponds.

Groundwater samples taken at the site indicated concentrations of arsenic, chromium, lead, copper, and nickel. No groundwater targets, only about 975 people use private groundwater wells within four miles of the site. The Jernigan's adjacent to Nucor's property have two groundwater wells both do not use them.

The site has a high probability of impacting surface water. No surface water ^{sampling} has been done. Sampling of both Nucor Creek and Lucas Creek is recommended. No surface water monitoring has occurred to assess the impact of Nucor Creek, Swamp, and Pond, but the potential exist for these to be impacted also. Fishing probably occurs on Lucas Creek and the pond constructed on it, and on Black Creek. Two endangered plant species are found within 4 miles of Nucor Steel. Wetlands are located on Lucas Creek and Black Creek.

Air pathway, there is a possibility of emission control dust being susceptible to blowing winds. However, there is only a small population living near the site. Other than the employees that are on-site.

Nucor's has an off-site emissions control dust disposal area that is owned by J.C. Jernigan. The Jernigan's live on this property. The soil samples indicated high concentrations of zinc and lead. Zinc concentrations were detected in the soybeans and weeds surrounding this off-site disposal area. No groundwater monitoring has occurred to assess the impact of this area. It is recommended that soil sampling and groundwater monitoring performed in this off-site disposal area.

Nucor Steel Company is given a "HIGH" priority for a Site Screening Investigation (SSI). At the time of the Site Screening Investigation (SSI) primary focus should be on collecting data from the surface water pathways especially the fisheries.

VIII. REFERENCES

1. South Carolina Department of Health and Environmental Control (SCDHEC). Bureau of Solid and Hazardous Waste Management (BSHWM). Memorandum from Ms. Marion Feagin to Donna Sightler concerning hydrogeology report. Copy Attached.
2. United States Geological Survey. Topographical Map - 7.5 minute series.
Dovesville - 1963
Mont Clair - 1963
Darlington East - 1963
Darlington West - 1963
3. Sightler, Donna P. Record of Communication (ROC) to Nucor Steel Company. Conversation with Mr. Walter Postlethwait concerning site specific information for Preliminary Assessment. Copy Attached.
4. SCDHEC-Bureau of Water Quality Assessment and Enforcement Division: Nucor Steel Company, Water Quality File: Groundwater Assessment Report on October 3, 1991 and Preliminary Assessment on August 14, 1990. Copy Attached.
5. SCDHEC-Bureau of Air Quality Control (BAQC): Nucor Steel Company, Air File: Process Description. Copy Attached.
6. SCDHEC-Bureau of Solid and Hazardous Waste. Nucor Steel Company, BSHWM File. Letter to BSHWM, attn. Cliff Caseey from Mark Millett concerning Permit Application. August 30, 1985. Copy Attached.
7. SCDHEC-Bureau of Solid and Hazardous Waste. Nucor Steel Company, BSHWM File: June 4, 1991. Copy Attached.
8. SCDHEC-Bureau of Solid and Hazardous Waste. Nucor Steel Company, BSHWM File: Copy Attached.
9. SCDHEC-Bureau of Water Quality Assessment and Enforcement Division: Nucor Steel Company, Water Quality File: Letter from Michael Young, SCDHEC to Water Quality Analysis Section concerning Wasteload Allocation Request. November 9, 1987. Copy Attached.

10. SCDHEC-Bureau of Water Quality Assessment and Enforcement Division: Nucor Steel Company, Water Quality File: Consent Order 86-86-W, consistently failed to achieve compliance. September 8, 1986. Copy Attached.
11. SCDHEC-Bureau of Solid and Hazardous Waste. Nucor Steel Company, BSHWM File. Hazardous Waste Inspection Checklist. August 29, 1989. Copy Attached.
12. SCDHEC-Bureau of Water Quality Assessment and Enforcement Division: Nucor Steel Company, Water Quality File: Letter to Hartsill Truesdale from Thomas Leydic concerning mill operations disposal. August 16, 1990. Copy Attached.
13. SCDHEC-Bureau of Solid and Hazardous Waste. Nucor Steel Company, BSHWM File. Letter to Bill Dauksch from Melissa Johnston concerning removal of waste piles. March 13, 1984. Copy Attached.
14. South Carolina Water Resources Commission. Copy Attached.
15. SCDHEC, Bureau of Water Supply, Surface Water Treatment Plant, Intakes Map of S.C. Copy Attached.
16. The South Carolina Heritage Trust Foundation. Dated January 1992. Copy Attached.
17. SCDHEC-Bureau of Solid and Hazardous Waste. Nucor Steel File: January 31, 1992. Copy Attached.
18. S.C. Water Resources Commission. Two year 24-hour. Darlington County.
19. Federal Register December 14, 1991.
20. Sightler, Donna P. ROC to Nucor Steel File: Conversation with Shelly Sherritt concerning RCRA. November 4, 1992. Copy Attached.
21. SCDHEC - Permitting Files - Nucor Plant Layout drawn by J. Kizziar on January 25, 1992.
22. SCDHEC - Permitting Files - Topo Map of landfill site. Dated November 11, 1984. By Ferrall J. Prosser.

23. SCDHEC Bureau of Solid and Hazardous RCRA Waste Generator Index.
Computer printout dated Feb. 12, 1990.
24. SCDHEC-Bureau of Solid and Hazardous Waste. Nucor Steel Company,
BSHWM File. Letter from Howard Petrie to April Grunsky. Copy
Attached.
25. U.S. Census Bureau. General Housing Characteristics, 1990. Copy Attached.
26. Ground Water Sources Inventory. Copy Attached.
27. General Engineering Laboratories. Original Drawing by Nucor Steel Drawing
#56-E-1712. Figure 2. Dated October 1, 1991.

Res. 1



MEMORANDUM

TO: Donna P. Sightler
Site Screening Section
Division of Site Engineering and Screening
Bureau of Solid and Hazardous Waste Management

FROM: Marion Feagin, Hydrologist MF
Superfund and Solid Waste Section
Division of Hydrogeology
Bureau of Solid and Hazardous Waste Management

DATE: November 4, 1992

RE: Nucor Steel
SCD 044 940 369
Darlington County
Preliminary Assessment - Hydrogeologic Review

A hydrogeologic review of the referenced site has been conducted to assist in completing a preliminary assessment for the Superfund program. The purpose of the hydrogeologic review is to provide information regarding the groundwater migration route of potential contaminants. It includes information obtained from South Carolina Water Resources Commission (SCWRC) well tabulations, available site specific information from the South Carolina Department of Health and Environmental Control (SCDHEC) files, a target survey using United States Geological Survey (USGS) topographic quadrangles, and a literature review.

According to Curley (1990), Newcome (1989), and a report entitled Groundwater Assessment Report, Nucor Steel (General Engineering Laboratories) dated October 1991, the following geologic units underlie the site:

<u>Name</u>	<u>Description</u>	<u>Estimated Hydraulic Conductivity</u>	<u>Estimated Depth of Occurrence</u>
Terrace Deposits	Sand, silty sand, and sandy clay	10^{-4} cm/sec	0 - 30 ft.

<u>Name</u>	<u>Description</u>	<u>Estimated Hydraulic Conductivity</u>	<u>Estimated Depth of Occurrence</u>
Black Creek Formation	Sand inter-bedded with silt, clay and sandstone	10^{-4} cm/sec	30 - 125 ft.
Middendorf Formation	Sand inter-bedded with clay	10^{-4} cm/sec	125 - 350 ft.
Cape Fear Formation	Sand and clay	10^{-4} cm/sec	350 ft. +

The aquifers of concern include the Terrace Deposits and the Black Creek Aquifer. Regional hydrogeologic data indicates that in the vicinity of the Nucor Steel facility the Black Creek Aquifer overlies a confining unit that likely restricts the downward vertical migration of groundwater into the Middendorf Aquifer. The referenced facility is not in an area of karst topography.

Water levels in on-site wells indicate the depth to groundwater across the site is between 1 and 25 feet. The predominant shallow groundwater flow direction appears to be to the northeast towards the Black Creek. However, water-level data from monitoring well MW-1 indicates that shallow groundwater beneath the southwestern portion of the site may be flowing to the southwest towards Lucas Creek.

A well inventory within the four-mile site radius indicates the following uses of groundwater from the aquifers of concern: industrial, livestock, domestic and public water supply. No alternate, readily available, unthreatened sources of groundwater exist within the four-mile site radius.

cc: Addie Collier, Pee Dee District

References Cited:

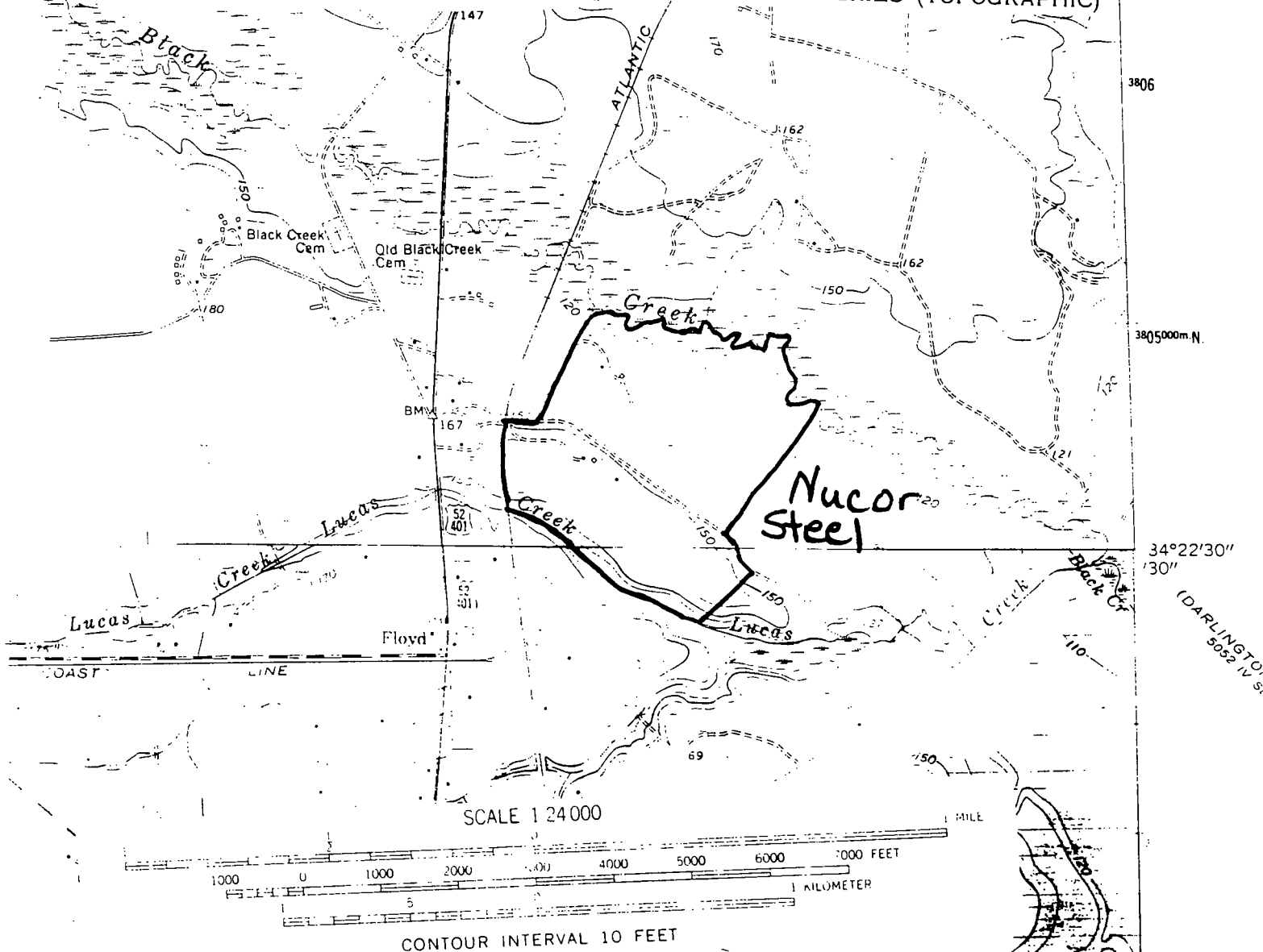
Curley, Robert E., 1990, Groundwater in the Pee Dee Region of South Carolina, SCWRC Open File Report #36.

General Engineering Laboratories, October 1991, Groundwater Assessment Report, Nucor Steel, Darlington, South Carolina.

Newcome, Roy, 1989, Groundwater Resources of South Carolina's Coastal Plain, SCWRC Report #167.

Nucor Steel
SCD044940369
Darlington County

DOVESVILLE QUADRANGLE
SOUTH CAROLINA
7.5 MINUTE SERIES (TOPOGRAPHIC)



DARLINGTON WEST QUADRANGLE
SOUTH CAROLINA—DARLINGTON CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

References Cited:

Curley, Robert E., 1990, Groundwater in the Pee Dee Region of South Carolina, SCWRC Open File Report #36.

General Engineering Laboratories, October 1991, Groundwater Assessment Report, Nucor Steel, Darlington, South Carolina.

Newcome, Roy, 1989, Groundwater Resources of South Carolina's Coastal Plain, SCWRC Report #167.

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342220.0 LATITUDE 795345.0 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES

THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY:	Dixie Cup Co.	COUNTY:		AQUIFER:		SCWRC:	17L--z01
CONTACT:	PHONE:	LONGITUDE:	79-52-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-17-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab; DC:Connolly;			LOCATION:	Darlington		

COMPANY:	Hartsville Oil Mill	COUNTY:		AQUIFER:		SCWRC:	19K--z01
CONTACT:	PHONE:	LONGITUDE:	80-02-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab;			LOCATION:	Hartsville		

COMPANY:	Hartsville Oil Mill	COUNTY:		AQUIFER:		SCWRC:	19K--z02
CONTACT:	PHONE:	LONGITUDE:	80-02-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab;			LOCATION:			

COMPANY:	Sonoco Corp.	COUNTY:		AQUIFER:		SCWRC:	19K--z03
CONTACT:	PHONE:	LONGITUDE:	80-02-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab; DC:Garland; Flows;			LOCATION:	Hartsville		

COMPANY:	Sonoco Corp.	COUNTY:		AQUIFER:		SCWRC:	19K--z04
CONTACT:	PHONE:	LONGITUDE:	80-02-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab; DC:Garland; Flows;			LOCATION:	Hartsville		

COMPANY:	Sonoco Corp.	COUNTY:		AQUIFER:		SCWRC:	19K--z05
CONTACT:	PHONE:	LONGITUDE:	80-02-95	COMP. DEPTH:	0	USE:	

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342220.0 LATITUDE 795345.0 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

ADDRESS:		LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
		DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS:	SCWRC Well tab; DC:Garland; Flows;		LOCATION: Hartsville	
COMPANY:	Sonoco Corp.	COUNTY:	AQUIFER:	SCWRC: 19K--z06
CONTACT:	PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:		LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
		DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS:	SCWRC Well tab; DC:Garland; Flows;		LOCATION: Hartsville	
COMPANY:	Sonoco Corp.	COUNTY:	AQUIFER:	SCWRC: 19K--z07
CONTACT:	PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:		LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
		DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS:	SCWRC Well tab; DC:Garland; Flows;		LOCATION: Hartsville	
COMPANY:	Sonoco Crop.	COUNTY:	AQUIFER:	SCWRC: 19K--z08
CONTACT:	PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:		LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
		DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS:	SCWRC Well tab; DC:Garland; Flows;		LOCATION: Hartsville	
COMPANY:	City of Hartsville	COUNTY:	AQUIFER:	SCWRC: 19K--z09
CONTACT:	PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:		LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
		DISTANCE: 0.00 MILES UNK	ELEV: 175.00	
REMARKS:	SCWRC Well tab; DC:Layne-Atlantic; T=64;		LOCATION:	
COMPANY:	City of Hartsville	COUNTY:	AQUIFER:	SCWRC: 19K--z11
CONTACT:	PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:		LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
		DISTANCE: 0.00 MILES UNK	ELEV: 175.00	

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S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342220.0 LATITUDE 795345.0 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

REMARKS:	SCWRC Well tab;	DC:Layne-Atlantic;	T=64;	LOCATION:	
COMPANY:	Carolina Utilities	COUNTY:		AQUIFER:	SCWRC: 17L--z02
CONTACT:	PHONE:	LONGITUDE:	79-52-95	COMP. DEPTH:	0 USE:
ADDRESS:		LATITUDE:	34-17-95	DRILL DEPTH:	0 YIELD: 0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00
REMARKS:	SCWRC Well tab; WS; PT:28;	LOCATION:	Darlington		
COMPANY:	Carolina Utilities	COUNTY:		AQUIFER:	SCWRC: 17L--z03
CONTACT:	PHONE:	LONGITUDE:	79-52-95	COMP. DEPTH:	0 USE:
ADDRESS:		LATITUDE:	34-17-95	DRILL DEPTH:	0 YIELD: 0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00
REMARKS:	SCWRC Well tab;	DC:Hughes Wells;	30ft cavity rept...;	LOCATION:	Darlington
COMPANY:	Darlington Bank &	COUNTY:		AQUIFER:	SCWRC: 17L--z04
CONTACT:	PHONE:	LONGITUDE:	79-52-95	COMP. DEPTH:	0 USE:
ADDRESS:		LATITUDE:	34-17-95	DRILL DEPTH:	0 YIELD: 0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00
REMARKS:	SCWRC Well tab;	Flows of 10 gpm;	LOCATION:	Trust Co.	
COMPANY:	Mr. L.G. O'Neal	COUNTY:		AQUIFER:	SCWRC: 19K--z12
CONTACT:	PHONE:	LONGITUDE:	80-02-95	COMP. DEPTH:	0 USE:
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0 YIELD: 0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00
REMARKS:	SCWRC Well tab;	DC:B. Moore;	LOCATION:	.6 mi. NE Hartsville	
COMPANY:	Ernest L. Jordan	COUNTY:		AQUIFER:	SCWRC: 18K--z01
CONTACT:	PHONE:	LONGITUDE:	79-57-95	COMP. DEPTH:	0 USE:
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0 YIELD: 0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00
REMARKS:	SCWRC Well tab;	DC:Jess Spiers;	T=65; Flows;	LOCATION:	2.5 mi. W Boveville

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S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342220.0 LATITUDE 795345.0 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY:	City of Hartsville	COUNTY:		AQUIFER:		SCWRC:	19K--z13
CONTACT:	PHONE:	LONGITUDE:	80-02-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab; DC:Layne-Atlantic; Test Well;	LOCATION:					

COMPANY:	Darlington Mfg. Co.	COUNTY:		AQUIFER:		SCWRC:	17L--z05
CONTACT:	PHONE:	LONGITUDE:	79-52-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-17-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab;	LOCATION:					

COMPANY:	Nucor Steel	COUNTY:		AQUIFER:		SCWRC:	17K--z01
CONTACT:	PHONE:	LONGITUDE:	79-52-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab; USGS Well files; DHEC;	LOCATION:	Darlington				

COMPANY:	Nucor Steel	COUNTY:		AQUIFER:		SCWRC:	17K--z02
CONTACT:	PHONE:	LONGITUDE:	79-52-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	DHEC;	LOCATION:	Darlington				

COMPANY:	Hartsville Well Fld	COUNTY:		AQUIFER:		SCWRC:	19K--z14
CONTACT:	PHONE:	LONGITUDE:	80-02-95	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-22-95	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	SCWRC Well tab; USGS Obs. Well; T:18Flowing;	LOCATION:	#2				

COMPANY:	Kelly's Country Kit.	COUNTY:		AQUIFER:		SCWRC:	17K--y01
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S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342220.0 LATITUDE 795345.0 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

CONTACT:	PHONE:	LONGITUDE:	79-54-22	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-20-52	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	1.79 MILES SSW	ELEV:	170.00		
REMARKS:	DHEC;		LOCATION:	Darlington			
COMPANY:	Magnolia Trailer Pk.	COUNTY:		AQUIFER:		SCWRC:	17L--g01
CONTACT:	PHONE:	LONGITUDE:	79-53-91	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-18-91	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	DHEC;		LOCATION:				
COMPANY:	Magnolia Trailer Pk.	COUNTY:		AQUIFER:		SCWRC:	17L--g02
CONTACT:	PHONE:	LONGITUDE:	79-53-91	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-18-91	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	0.00 MILES UNK	ELEV:	0.00		
REMARKS:	DHEC;		LOCATION:				
COMPANY:	Yardborough Trailer	COUNTY:		AQUIFER:		SCWRC:	17L--d01
CONTACT:	PHONE:	LONGITUDE:	79-53-26	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-19-19	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	3.48 MILES SSE	ELEV:	160.00		
REMARKS:	DHEC;		LOCATION:	Park			
COMPANY:	Swink's Trailer Park	COUNTY:		AQUIFER:		SCWRC:	17L--d02
CONTACT:	PHONE:	LONGITUDE:	79-53-31	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-19-50	DRILL DEPTH:	0	YIELD:	0
		DISTANCE:	2.88 MILES SSE	ELEV:	62.00		
REMARKS:	DHEC;		LOCATION:	Darlington			
COMPANY:	Wallace Mobile Home	COUNTY:		AQUIFER:		SCWRC:	17K--p02
CONTACT:	PHONE:	LONGITUDE:	79-54-20	COMP. DEPTH:	0	USE:	
ADDRESS:		LATITUDE:	34-21-12	DRILL DEPTH:	0	YIELD:	0

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342220.0 LATITUDE 795345.0 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

REMARKS: DHEC;		DISTANCE: 1.42 MILES SSW	ELEV: 172.00	LOCATION: Park, Dovesville Hwy
COMPANY: Landfill site	PHONE:	COUNTY: LONGITUDE: 79-56-00	AQUIFER: COMP. DEPTH: 0	SCWRC: 18K--s01 USE:
ADDRESS:		LATITUDE: 34-21-50	DRILL DEPTH: 0	YIELD: 0
REMARKS: DHEC;		DISTANCE: 2.22 MILES WSW	ELEV: 181.00	LOCATION: Darlington
COMPANY: W.W. Kirven	PHONE:	COUNTY: LONGITUDE: 79-50-50	AQUIFER: COMP. DEPTH: 50	SCWRC: 18K--k01 USE: IR
ADDRESS:		LATITUDE: 34-22-30	DRILL DEPTH: -1	YIELD: 100
REMARKS: Casing 0-40; Screen 40-50.		DISTANCE: 2.79 MILES ENE	ELEV: -1.00	LOCATION: W.W. Kirven
COMPANY: Dar. Co. Dev. W&S A.	PHONE:	COUNTY: LONGITUDE: 79-54-05	AQUIFER: COMP. DEPTH: 480	SCWRC: 17K--f01 USE:
ADDRESS: Dovesville, , SC		LATITUDE: 34-23-41	DRILL DEPTH: 360	YIELD: -1
REMARKS:		DISTANCE: 1.58 MILES NNW	ELEV: 160.00	LOCATION: Dovesville
COMPANY: Perfection Gear Co.	PHONE:	COUNTY: LONGITUDE: 79-54-12	AQUIFER: COMP. DEPTH: 280	SCWRC: 17K--p01 USE: IN
ADDRESS: Darlington, , SC		LATITUDE: 34-23-31	DRILL DEPTH: 476	YIELD: -1
REMARKS: Date completed was 5/65.		DISTANCE: 1.43 MILES NNW	ELEV: 170.00	LOCATION: Darlington
COMPANY: Bethea Baptist Home	PHONE:	COUNTY: LONGITUDE: 79-50-91	AQUIFER: COMP. DEPTH: 331	SCWRC: 17L--u01 USE:
ADDRESS: Darlington, , SC		LATITUDE: 34-17-95	DRILL DEPTH: 300	YIELD: -1
REMARKS: Water is sampled once a mth by state mgn.		DISTANCE: 0.00 MILES UNK	ELEV: 138.00	LOCATION: Darlington

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S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342220.0 LATITUDE 795345.0 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY:	Mrs. J.B. Colbert	COUNTY:		AQUIFER:		SCWRC:	18K--h01
CONTACT:	PHONE:	LONGITUDE:	79-57-23	COMP. DEPTH:	225	USE:	DO
ADDRESS:	Auburndale Farms	LATITUDE:	34-23-37	DRILL DEPTH:	290	YIELD:	50
	Hartsville, , SC	DISTANCE:	3.77 MILES WNW	ELEV:	155.00		
REMARKS:	Date completed was 1954.			LOCATION:	Hartsville		
COMPANY:	W.W. Kirven	COUNTY:		AQUIFER:		SCWRC:	17K--k01
CONTACT:	PHONE:	LONGITUDE:	79-50-50	COMP. DEPTH:	50	USE:	IR
ADDRESS:		LATITUDE:	34-22-30	DRILL DEPTH:	-1	YIELD:	100
		DISTANCE:	2.79 MILES ENE	ELEV:	-1.00		
REMARKS:	Casing 0-40; Screen 40-50.			LOCATION:	W.W. Kirven		
COMPANY:	WILLIAM F HUDSON	COUNTY:		AQUIFER:		SCWRC:	17L--e01
CONTACT:	W.F. HUDSON	PHONE:	393-7748	LONGITUDE:	79-54-33	COMP. DEPTH:	39
ADDRESS:	RT 5 BOX 24			LATITUDE:	34-19-12	DRILL DEPTH:	-1
	DARLINGTON , SC 29532	DISTANCE:	3.68 MILES SSW	ELEV:	171.00	YIELD:	15
REMARKS:				LOCATION:	1.3M FROM HWY 52 N ON GILCHRIS		
COMPANY:	Kirven Farm	COUNTY:	Darlington	AQUIFER:		SCWRC:	16IR07G01
CONTACT:	PHONE:	LONGITUDE:	79-50-50	COMP. DEPTH:	0	USE:	
ADDRESS:	Rt. 5, Box 110	LATITUDE:	34-22-30	DRILL DEPTH:	0	YIELD:	0
	Darlington , SC 29532	DISTANCE:	2.79 MILES ENE	ELEV:	0.00		
REMARKS:				LOCATION:			
COMPANY:	Kirven Farm	COUNTY:	Darlington	AQUIFER:		SCWRC:	16IR07G02
CONTACT:	PHONE:	LONGITUDE:	79-50-50	COMP. DEPTH:	0	USE:	
ADDRESS:	Rt. 5, Box 110	LATITUDE:	34-22-30	DRILL DEPTH:	0	YIELD:	0
	Darlington , SC 29532	DISTANCE:	2.79 MILES ENE	ELEV:	0.00		
REMARKS:				LOCATION:			

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342220.0 LATITUDE 795345.0 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY:	Law Farm	COUNTY:	Darlington	AQUIFER:		SCWRC:	16IR24G01		
CONTACT:		PHONE:		LONGITUDE:	79-55-40	COMP. DEPTH:	0	USE:	
ADDRESS:	Rt. 6, Box 207			LATITUDE:	34-19-20	DRILL DEPTH:	0	YIELD:	0
	Darlington , SC	29532		DISTANCE:	3.90 MILES SSW	ELEV:	0.00		
REMARKS:				LOCATION:					

COMPANY:	City of Darlington	COUNTY:	Darlington	AQUIFER:		SCWRC:	16WS02G01		
CONTACT:		PHONE:		LONGITUDE:	79-54-12	COMP. DEPTH:	0	USE:	
ADDRESS:	Post Office Box 629			LATITUDE:	34-21-01	DRILL DEPTH:	0	YIELD:	0
	Darlington , SC	29532		DISTANCE:	1.57 MILES SSW	ELEV:	0.00		
REMARKS:				LOCATION:					

U.S. EPA REGION IV

SDMS

Unscannable Material Target Sheet

DocID: 10705970

Site ID: SCD044940369

Site Name: Ducor Steel

Nature of Material:

Map:

☒

Computer Disks:

☐

Photos:

☐

CD-ROM:

☐

Blueprints:

☐

Oversized Report:

☐

Slides:

☐

Log Book:

☐

Other (describe): Radius Map

Amount of material: _____

* Please contact the appropriate Records Center to view the material *

Ref. 3

SITE NAME: Nucor Steel
EPA ID NUMBER: SCD 044 940 369

RECORD OF COMMUNICATION

☒ Phone Call
☐ Discussion
☐ Field Trip
☐ Conference
☐ Other (Specify)

TO: Nucor Steel File

FROM: Donna Sightler

DATE: October 29, 1992

TIME: 2:15

SUBJECT: Summary of Conversation with Mr. Wally Postlethwait of Nucor Steel
regarding site specific Information for P.A.

SUMMARY OF COMMUNICATION:

Mr. Wally Postlethwait told me that Nucor had 475 to 500 employees. Nucor began operation in 1969 and have been the only company on this property. The slag processing Co. is on Nucor's property, but the scrap handling is not on Nucor's property they are adjacent to Nucor.

Mr. Wally Postlethwait said that he would fax me the information on the dimensions for their four cooling ponds, and one holding pond, and also their on-site landfill.

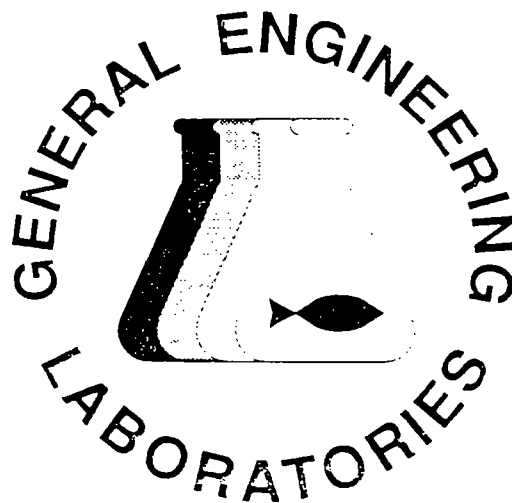
CONCLUSIONS, ACTIONS TAKEN OR REQUIRED:

INFORMATION COPIES TO:

File

Ref. 4

PRELIMINARY SITE ASSESSMENT
NUCOR STEEL
DARLINGTON, SOUTH CAROLINA



Submitted to:

South Carolina Department of
Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Submitted by:

General Engineering Laboratories
2040 Savage Road
Charleston, South Carolina 29414

Submittal Date: August 14, 1990

PRELIMINARY SITE ASSESSMENT
NUCOR STEEL
DARLINGTON, SOUTH CAROLINA

I. Introduction

This document presents the results of a preliminary site assessment requested by Mr. Thomas Leydic for Nucor Steel in Darlington, South Carolina. The purpose of the study was to provide baseline environmental data for soils, and to determine the potential of impact, if any, to the soils and groundwater as a result of previous plant operations.

A. Facility Background

The Nucor Steel site is located in Darlington, South Carolina, and occupies approximately 230 acres on the east side of U.S. Highway 52 North. Nucor began operations at their Darlington location in 1969. Prior to the construction of the facility, the property was used for agricultural purposes. The property is bounded to the northeast by Black Creek and to the southwest by Lucas Creek. Since startup, the plant has operated continuously as a steel manufacturing facility converting scrap steel into products such as angle iron, rounds, channels, and flat bars.

Because Nucor does not have access to public water utilities, their potable and process water is supplied by onsite wells. Nucor operates a waste treatment system for sanitary sewer discharges. The treated wastewater from this system is discharged to Lucas Creek under NPDES permit number SC0035238. Stormwater drains on Nucor's property also discharge to Lucas Creek.

Nucor generates both hazardous and nonhazardous waste materials from the steel manufacturing process. The hazardous wastes generated are emission control dust, and waste Varsol, produced in a degreasing operation. The waste Varsol degreaser is shipped off-site for reclamation. The emission control dust is shipped to fertilizer manufacturing companies for use as a raw material.

However, through discussions with plant personnel during the recent orientation of the new manager for this facility it was learned that up until the mid 1970's, some emission control dust was used as a fill material at the plant site. Nucor employees also identified two emission control dust deposits, also made in the early to middle 1970's, in a field near the plant site. These deposits are shown in Figure 1.

The nonhazardous wastes generated at this site include waste oil, scale, slag, contact cooling water sludge (sludge) and skulls. The waste oil is shipped off-site for recycling. The scale, which is an iron oxide material, is sold as a strengthener or binder in concrete. The slag is processed at the Nucor site by an outside contractor for use as road surfacing material. The sludge material is composed of scale, slag and traces of lubricating oil. Nucor has received permission from the South Carolina Department of Health and Environmental Control (DHEC) to land farm the sludge. Skulls, composed of steel and slag, are the solidified residue which forms on the inside of the ladles used to hold and pour the molten steel. These skulls are either recycled in the steel manufacturing process or processed onsite along with the slag for use as road surfacing material.

As with the emission control dust, Nucor personnel also identified several areas onsite where the slag, scale, sludge and skulls were incorporated into the fill material. The approximate locations of these fill areas, as reported by Nucor personnel, are shown in Figure 1.

Nucor operates several concrete contact and non-contact cooling water ponds, which are shown in Figure 1. Most of the cooling water is recycled to various plant processes. However, overflows from these ponds do result in periodic discharges. The contact cooling pond overflows contain the sludge material defined as slag, scale, and lubricating oil. The non-contact cooling water is not thought to be impacted and therefore overflows from non-contact cooling water ponds do not represent the potential for environmental impact. However, analysis of this water would be necessary to confirm that it does not contain significant concentrations of potential contaminants.

Until recently, overflow from the contact cooling ponds was piped via reinforced concrete pipe (RCP) to the northeast side of the plant and discharged onto the land surface. This discharge stream is referred to in Figure 1 as Nucor Creek. Once this discharge was identified as a potential source of environmental impact, Nucor diverted this flow to an open-top, in-ground concrete holding tank located on the northeast side of the plant, as shown in Figure 1. Nucor Creek flows into Nucor Swamp, where it empties into Nucor Pond, located approximately 1300 feet east of the discharge pipe. These areas are also identified in Figure 1.

The overflows from the non-contact cooling ponds are piped to both Lucas Creek and Nucor Pond.

✓The cooling ponds are shut-down twice a year for cleaning and routine maintenance. During shut-down the water from the contact cooling water ponds is discharged to the concrete in-ground tank identified above. The water from the non-contact cooling water ponds is then used to fill the contact cooling water ponds after they are cleaned.

B. Geology and Hydrogeology

The Nucor site is located in the Middle Coastal Plain Physiographic Province of South Carolina. The coastal plain is composed of mostly unconsolidated and lithified sedimentary strata overlying a basement of igneous and metamorphic rocks. The total thickness of strata underlying the site is approximately 600 to 700 feet.

Previous regional studies and onsite investigations of the facility indicate that the soils at the site are composed mostly of deltaic sand and clay sediments of the Cretaceous age Black Creek Formation, overlain by mostly fill material. Metal and steel debris are also present at this site.

Black Creek Formation sediments comprise the uppermost aquifer, the Black Creek Aquifer, which is approximately eighty feet thick in the vicinity of the Nucor site and dips in a southeasterly direction towards the Atlantic Ocean. These strata overlie a regionally extensive clay confining layer. This confining layer separates the Black Creek Aquifer from the Cretaceous Middendorf Aquifer System.

Due to the topography at the site, the water table is encountered at depths ranging from one foot below the land surface in the vicinity of Black Creek to greater than fifteen feet in the vicinity of the main plant area. Much of the developed portion of the site appears topographically as a northwest-southeast trending knoll which generally dips to the northeast and the southwest. Therefore, groundwater underlying portions of the site most likely flows towards Black Creek and other portions toward Lucas Creek.

II. Preliminary Site Investigation

The areas described in Section I.A as containing fill materials are shown in Figure 1. Since these areas are potential sources of impact to soils and groundwater, Nucor Steel requested a preliminary site investigation to determine the potential of impact, if any, from previous plant operations.

A. Analysis of Waste Materials

Samples of slag, scale, sludge and emission control dust were analyzed for the thirteen priority pollutant metals to determine the major constituents in these waste materials for use in analysis of soil samples subsequently collected at the site. Samples of the skulls were not analyzed due to their large size and because their disposal is not thought to be a source for potential impact.

The slag, scale, and sludge were found to contain significant concentrations of arsenic, copper, cadmium, chromium, lead, nickel, and zinc. These analytical results are presented in Appendix I. The results of analysis of a sample of emission control dust is identified in Appendix I as 'SB-12 Surface'. This sample was collected from the surface soils surrounding a baghouse used for the collection of emission control dust. However, these soils did not contain significant concentrations of metals typically characteristic of emission control dust. The metal concentrations detected in the surface soils collected from emission control dust disposal areas represented by soil borings SB-19 or SB-20, discussed later in this report, are more representative of emission control dust.

Because of the elevated concentrations of total cadmium, chromium, and lead in the slag, scale, and sludge, these materials were analyzed using the Toxicity Characteristic Leaching Procedure (TCLP). Emission control dust, which is designated as a K061 listed hazardous waste due to the presence of hexavalent chromium, lead, and cadmium, was also analyzed using the TCLP. Surface soils from sample location SB-19 were used for this TCLP analysis of the emission control dust.

To determine the metals to be analyzed for TCLP, the total metal concentrations detected in the slag, scale, sludge, and emission control dust were divided by the twenty-fold dilution factor used in the TCLP model to provide an indication of the concentration of the metals that could potentially be contained in the leachate from these materials. Based on the twenty-fold dilution factor, it was determined that these materials could potentially be characteristically hazardous based on total concentrations of the following constituents:

Waste Material

Slag
Scale
Sludge
Emission Control Dust

TCLP Constituent

Chromium ✓
Chromium ✓
Chromium and Cadmium ✓
Chromium, Cadmium and Lead

The TCLP results, presented in Appendix II for the above referenced metals, confirm that the slag, scale, and sludge are not characteristic hazardous wastes. The emission control dust generated from Nucor's operations, a listed hazardous waste generally due to its potential for leachable concentrations of cadmium, chromium, and lead, appears only to exceed the regulatory limit for lead concentrations in the TCLP extract. ✓

B. Background Conditions

Representative soil samples were collected from borings identified in Figure 1 as SB-16, SB-17, and SB-18. These soil borings were constructed in areas which, according to Nucor personnel, had not been filled with slag, scale, sludge, sculls, or emission control dust and are thought to be representative of background conditions in the area. The analytical results for these samples are provided in Appendix III. A summary of the background metal concentrations for the samples analyzed is shown below.

Background Conditions

<u>Metal</u>	<u>Range of Background Metal Concentrations (ppm)</u>
Arsenic	<1.0 - 3.1
Cadmium	<0.5
Chromium	2.5 - 13.0
Copper	<1.0 - 5.2
Lead	<1.0 - 6.4
Nickel	2.2 - 6.1
Zinc	5.8 - 35.0

These background concentrations were used in this assessment for evaluating impact to soils collected from areas which have debris and steel by-products incorporated into the fill material. Although these concentrations will be considered background for this assessment, analysis of additional background soils will be needed to fully define background conditions.

C. Fill Areas Surrounding Plant

Initially, the intent of the investigation was to confirm the presence of the reported fill materials and determine the depth and lateral extent of the reported fill areas. However, after inspecting the site with Nucor personnel, it was determined that the areas would be difficult to delineate due to obstructions such as buildings, steel debris, and skulls.

Therefore, to confirm the presence of the fill material and to determine the potential for impact to the soils and groundwater, fourteen boreholes were strategically located near areas surrounding the main plant which were identified by Nucor personnel as having been back filled with slag, scale, sludge, skull, or emission control dust. These boring locations are designated in Figure 1 as SB-1A through SB2-A and SB-4 through SB-14.

The boreholes were to be constructed to a depth of approximately five feet. However, in most cases the boreholes could not be advanced more than one to two feet due to obstructions, such as skulls, underlying the fill areas. In most of the locations where the soil borings were constructed, the fill material containing steel by-product wastes was buried, and could not be identified from an inspection of the surface soils. In areas where slag and scale were disposed of, the subsurface soils contained small pieces of slag or scale which could be identified by close inspection. Subsurface soils impacted with the sludge were characterized by a black discoloration. Soils impacted with emission control dust were identified as containing visible grey dust fines.

The soil samples were analyzed for the seven metals determined to be characteristic of the slag, scale, sludge, and emission control dust. The analytical results for these samples are presented in Appendix III.

Inspection and analysis of soils collected from boring locations SB1-A and SB1-B indicate the fill material in these areas is a clean homogeneous clay that does not contain steel by-product wastes. However, metal concentrations above background levels were detected in soil samples collected from eleven of the fourteen borings constructed at the site to detect impact from disposal of steel by-product wastes. The following table summarizes this data.

Summary of Samples Collected in Fill Areas

<u>Boring Location</u>	<u>Depth</u>	<u>Metals Elevated Above Background</u>	<u>Reported Fill Material</u>
SB1-A and SB1-B	4 feet	No metals above background	clay
SB2-A	2 feet	Cr, Cu, Pb, Ni, Zn	slag
SB-4	5 feet	Cr, Cu	slag
SB-5	surface	As, Cr, Cu, Pb, Ni, Zn	sludge
SB-5	4 feet	Cu	sludge
SB-6	2 feet	Cu, Pb, Zn	dust/slag
SB-7	2 feet	No metals above background	scale/slag
SB-7	5 feet	No metals above background	scale/slag
SB-8	surface	As, Cd, Cr, Cu, Pb Ni, Zn	emission control dust
SB-8	6 feet	Pb, Zn	emission control dust
SB-9	1 foot	As, Cd, Cr, Cu, Pb Ni, Zn	emission control dust
SB-10	surface	Cu	sludge
SB-10	4 feet	As, Cr, Cu, Pb, Ni, Zn	sludge
SB-12	7 feet	Cd, Cr, Pb, Zn	emission control dust
SB-13	1 foot	As, Cd, Cr, Cu, Pb Ni, Zn	slag
SB-14	1.5 feet	As, Cr, Cu, Pb, Ni, Zn	slag

Soil boring SB-11 was constructed in an area near an empty above ground storage tank reported to have formerly contained lubricating oil. There were localized areas of surface soil around the tank which were stained with oil. The boring was advanced to a depth of approximately 3.5 feet. At this depth there were no discolored soils or odors indicative of hydrocarbons. Total petroleum hydrocarbons (TPH) were not detected in a

soil sample collected at the depth of completion at a method detection limit of 10 parts per million (ppm).

D. Nucor Creek, Swamp, and Pond

To investigate potential impact from discharges of contact cooling water, seven borings were constructed in the area surrounding Nucor Creek, Nucor Swamp, and Nucor Pond. These borings were constructed at the locations noted in Figure 1 as borings SB-15 and SB-21 through SB-26. Soil samples were collected, just above the water table at the depth of completion of each of these borings, and analyzed for the seven target metals and TPH.

Soil boring SB-15 and SB-26 were constructed adjacent to Nucor Creek where the surface soils were visually impacted from sludge contained in the discharged contact cooling water. Analysis of soil samples collected from these boreholes detected the presence of elevated concentrations of metals and hydrocarbons. Sample SB-26, located upgradient of Nucor Creek, was constructed in an area where the surface soils appeared to be visually impacted with sludge. However, analysis of a soil sample collected at the water table did not detect the presence of hydrocarbons or elevated concentrations of metals. Surface soils in the area surrounding Nucor Pond did not appear to be impacted. Analysis of soils collected from boreholes constructed in the vicinity of the Pond also did not detect impact.

Certificates of Analysis for soil samples SB-15 and SB-21 through SB-26 are included in Appendix III. The results of these analyses are summarized in the table below.

**Summary of Samples Collected Near Nucor
Creek, Swamp, and Pond**

<u>Boring Location</u>	<u>Depth</u>	<u>TPH/Elevated Metal Concentrations Detected</u>
SB-15	1.5 feet	As, Cd, Cr, Cu, Pb, Ni, Zn, TPH
SB-26	1.0 feet	Cd, Cr, Cu, Pb, Zn, TPH
SB-21	1.0 feet	TPH
SB-22	1.0 feet	None
SB-23	4.5 feet	None
SB-24	3.5 feet	TPH
SB-25	4 feet	None

E. Off-Site Disposal of Emission Control Dust

In response to reports of former off-site disposal of emission control dust, soil borings SB-19 and SB-20 were constructed in the center of the two areas shown in Figure 1. Both of these areas are located in a field near the plant site. Soil samples were collected at the surface, at a depth of four feet and at the bottom of the borehole. Soil boring SB-19 was advanced to ten feet, but the water table was not encountered. Soil boring SB-20 encountered the water table at a depth of approximately seven feet.

Visual inspection of the two disposal areas revealed some emission control dust on the surface which had apparently formed into small nuggets. The subsurface soils collected at a depth of four feet contained grey dust fines, indicative of emission control dust. Laboratory analysis of the surface soil samples detected elevated concentrations of arsenic, cadmium, chromium, copper, lead, nickel, and zinc in the soils. With the exception of arsenic, these same metals were also detected at elevated levels in the soils collected at a depth of four feet. However, the soils collected from the depth of completion of the boreholes did not contain grey dust fines and analysis of these samples did not detect any impact. The analytical results for the soils collected from these areas are presented in Appendix III.

Since the emission control dust disposal area identified by soil boring SB-20 is located on a small knoll on the side of a soybean field, individual grab samples of the vegetation and surface soils in the vicinity of the site were collected and analyzed for the seven target metals. These sample locations are identified in Figure 1. As shown in this Figure, the nearest soybean plants to the disposal area are located approximately fifteen feet on the upgradient side of the area and no soybean plants are located downgradient of the disposal site. The nearest vegetation downgradient of the disposal site was a patch of weeds located at a distance of approximately seventy-five feet.

Four samples of soils and soybean plants were collected at a distance of at least 200 feet from the disposal site as shown in Figure 1. A composite of these four samples was analyzed, the results of which are thought to be representative of background conditions.

Certificates of Analysis for these samples are included in Appendix III. These findings are summarized in the following table:

Comparison of Lead and Zinc Concentrations
in Soil and Vegetation Surrounding Disposal Site Referenced by
Soil Boring Location SB-20

	<u>Background Composite</u>	<u>15 feet Up-gradient of Disposal Site</u>	<u>25 feet Up-gradient of Disposal Site</u>	<u>75 feet Down-gradient of Disposal Site</u>
Soil				
Zinc	13	190	150	400
Lead	5.7	43	33	100
Soybean				
Zinc	26	65	120	NA
Lead	4.7	4.5	7.4	NA
Weed				
Zinc	NA	NA	NA	240
Lead	NA	NA	NA	7.5

The soil samples collected from areas of the field surrounding the disposal site appear to contain slightly elevated levels of zinc and lead, when compared to background samples. Analysis of the weeds and soybean plants collected adjacent to the disposal site also detected slightly elevated zinc levels. However, in general, the amount of zinc in plants will be toxic to crops before the concentration in the plant tissues reaches a level that poses a problem to human or animal health.¹ The lead concentration detected in the soybeans and weeds is typical of the background levels. These results confirm that lead is not readily accumulated in plants.²

III. Conclusions

Based on the results of the preliminary site assessment, the following conclusions are presented.

A. Areas within the Nucor Property Indicating Soil Impact

Analysis of the soils collected from eleven of the fourteen soil boring locations constructed near reported fill areas confirm the presence of steel by-products in fill

¹ Land Application of Municipal Sludge, EPA Process Design Manual, October 1983, page 6-10.

² Ibid.

materials. However, with the exception of the emission control dust, the waste materials disposed of in these soils do not appear to be hazardous, based on the results of TCLP analyses.

The analytical results for samples collected, just above the water table from soil borings constructed near Nucor Creek and Nucor Swamp indicate elevated concentrations of metals and hydrocarbons in the subsurface soils. These elevated concentrations are probably the result of discharges of contact cooling water to Nucor Creek. The extent and severity of any impact to groundwater has not been determined. However, it appears that groundwater impact, if any, is confined to the area immediately underlying and adjacent to Nucor Creek and Nucor Swamp, since analysis of soil samples collected just above the water table around Nucor Pond and up-gradient of Nucor Creek do not detect impact.

Nucor has discontinued discharge of the contact cooling water to Nucor Creek. This flow has been diverted to the open-top, in-ground tank on the northeast side of the plant. Nucor plans to have the wastewater that has accumulated in this tank removed and disposed of in accordance with DHEC regulations and the tank inspected to insure that its operation does not result in future impact to underlying soils and groundwater.

As part of the second phase of this investigation, monitoring wells will be installed in strategic locations near the fill areas surrounding the plant and in the vicinity of Nucor Creek, Nucor Swamp, and Nucor Pond to determine the quality of groundwater underlying the site. The installation of these wells is discussed in a report entitled "Groundwater Assessment Plan" submitted by General Engineering Laboratories, with this report.

Following the completion of the groundwater assessment, a report will be submitted to DHEC which will discuss the results of the groundwater study and include recommendations for future actions in these areas. Also, Nucor is in the process of reviewing its operating permits and will submit any necessary permit applications and make any necessary process modifications or additions to insure that the plant operations do not impact the environment.

B. Off-Site Disposal of Emission Control Dust

Analysis of soil samples collected at the surface and at a depth of four feet from soil borings located in the center of each of the two former off-site emission control dust disposal areas detected elevated metal concentrations which are typical of emission control

dust. However, the analysis of a soil sample collected from boring SB-19 at a depth of ten feet did not detect impact. Also, analysis of a soil sample collected from boring SB-20 just above the water table, at a depth of seven feet, gave no indication of impact.

Based on these results, there is no indication of impact to groundwater in either of these two former disposal areas. However, additional assessment will be conducted to determine the vertical and horizontal extent of impact to the soils in each of the areas.

Analysis of surface soils in the field surrounding the former disposal site in the vicinity of boring SB-20 appear to contain slightly elevated levels of zinc and lead, when compared to background samples. Lead concentrations detected in the soybeans and weeds are typical of vegetation in the background areas. Analysis of the weeds and soybean plants collected adjacent to the disposal site have detected slightly elevated zinc levels. However, published reports state that the level of zinc in plants will be toxic to crops before it reaches a level that poses a problem to human or animal health.

Ref. 4

GROUNDWATER ASSESSMENT REPORT

NUCOR STEEL DARLINGTON, SOUTH CAROLINA

I. INTRODUCTION

This document presents the findings of the groundwater assessment that was conducted at the Nucor Steel facility located off Highway 52 in Darlington, South Carolina. General Engineering Laboratories (GEL) was retained by Nucor Steel to perform this investigation which included the following tasks:

- Installation of ten permanent monitoring wells into the uppermost aquifer at the facility;
- Collection and analysis of groundwater samples collected from the monitoring wells for PAHs and the total recoverable and dissolved fractions of arsenic, lead, cadmium, chromium, copper, nickel, and zinc; and
- Preparation of a groundwater potentiometric surface map for the facility.

This investigation was conducted in accordance with the "Groundwater Assessment Plan" submitted to the South Carolina Department of Health and Environmental Control (DHEC) on February 2, 1990, and the letter dated May 6, 1991 from Mr. Bruce Crawford of DHEC to Ms. Carey Bocklet of GEL.

This investigation was prompted by the results of soil analyses performed as part of a previous investigation. This prior investigation, conducted by GEL, identified heavy metals and TPH impact in surface and subsurface soil samples collected in the vicinity of the plant and Nucor Pond. The details of this investigation were described in the "Preliminary Site Assessment" submitted to DHEC on August 14, 1990. This assessment was designed to determine the presence or absence of soils impact as a result of previous activities conducted at the site.

II. FACILITY DESCRIPTION AND PREVIOUS ACTIVITIES

The Nucor site, as shown on Figure 1, occupies approximately 230 acres on the eastern side of U.S Highway 52, approximately ten miles north of Darlington, South Carolina. Prior to the construction of the facility approximately 20 years ago, the property was used for agricultural purposes. The property is bounded to the northeast by Black Creek and to the southwest by Lucas Creek.

The plant has operated continuously since start-up as an industrial facility which processes scrap steel in the manufacturing of steel products such as angle iron, rounds, channels, and flat bars.

Because Nucor has a high demand for water, process water is supplied by onsite wells, approximately 200 feet deep and potable water is supplied by the city of Darlington. Because sewer utilities are not available, Nucor operates a wastewater treatment system for sanitary wastes. The treated wastewater from this system is discharged to Lucas Creek under NPDES permit number SC0035238.

Nucor generates both hazardous and nonhazardous waste materials from the steel manufacturing process. The hazardous wastes generated include emissions control dust, and spent varsol from degreasing operations. Up until the mid 1970's, some of the emissions control dust was reportedly used as a fill material in various locations within the plant property. These past disposal areas are identified on Figure 2.

The nonhazardous wastes generated include waste oil, scale, slag, sludge, and skulls. The slag is processed onsite by a road construction company for use as road surfacing material. The sludge material is composed of scale, slag and lubricating oil. Nucor has received approval from DHEC to land farm the sludge. Skulls, composed of steel and slag, are the solidified residue which forms on the inside of the ladles used to hold and pour the molten steel during the steel manufacturing process. These skulls are either recycled in the steel manufacturing process or processed onsite along with the slag for use as road surfacing material.

As with the emission control dust, the slag, scale, sludge and skulls were formerly incorporated into the fill material at the site. The approximate locations of these fill areas, as reported by Nucor personnel, are identified on Figure 2.

Nucor operates two contact and two non-contact cooling water ponds which are also shown on Figure 2. These ponds are completely lined with concrete and the cooling water is continuously recycled in the process. However, there are some periodic discharges from these ponds due to overflow.

The contact cooling water overflow contains some of the sludge material described above. Until recently, this overflow was piped to the northeast side of the plant and discharged onto the land surface. This discharge formed the headwaters of a small stream referred to as Nucor Creek. Nucor Creek flows into Nucor Swamp, which empties into Nucor Pond, located approximately 1300 feet from the overflow discharge pipe. This overflow was identified as an unpermitted discharge during the preliminary site

assessment. Subsequently, Nucor diverted this flow to an open top, in-ground concrete-lined holding tank located on the northeast side of the plant at the location shown on Figure 2. The non-contact cooling water overflow from the North Cooling Water Pond is discharged directly to Nucor Pond.

III. LOCAL GEOLOGY AND HYDROGEOLOGY

A. Geologic Setting

The Nucor site is located in the Middle Coastal Plain Physiographic Province of South Carolina. The coastal plain is composed of unconsolidated and lithified sedimentary strata overlying igneous and metamorphic rocks. The total thickness of sedimentary strata underlying the site is approximately 600 to 700 feet.

Previous regional studies and onsite investigations of the facility indicate that the native soils at the site are composed mostly of deltaic sand and silt sediments of the Cretaceous age Black Creek Formation. These soils are locally overlain by fill material which includes metal debris and steel by-products.

B. Site Geology and Hydrogeology

Black Creek Formation sediments comprise the uppermost aquifer. This Black Creek Aquifer is approximately eighty feet thick in the vicinity of the Nucor site. This aquifer dips in a southeasterly direction towards the Atlantic Ocean and overlies a regionally extensive clay confining layer. This confining layer separates the Black Creek Aquifer from the Cretaceous Middendorf Aquifer System.

Nucor Steel is located in the catchment basin (recharge area) of the Black Creek Aquifer. The Black Creek aquifer encountered at the Nucor facility is unconfined; however, as the Black Creek Aquifer dips to the southeast it becomes confined, and consequently, is used as a potable water source that supplies many groundwater wells east of the Darlington area.

Due to varying topography at the site, the water table is encountered at depths ranging from one foot below land surface in the vicinity of Black Creek to greater than twenty-five feet below land surface in the vicinity of the main plant. Much of the developed portion of the site is located on a northwest-southeast trending knoll. The flanks of the knoll generally slope to the northeast and the southwest. Therefore, groundwater underlying the northeast side of the knoll flows to the northeast towards Black Creek. Groundwater underlying the southwest side of the knoll flows southwest towards Lucas Creek.

IV. MONITORING WELL INSTALLATION

Ten shallow monitoring wells, MW-1 through MW-10, were installed on June 3 through 5, 1991 at the locations shown on Figure 2. Construction details for these wells, including lithologic logs, well schematics, latitude/longitude coordinates, and other pertinent information, are presented in Appendix I.

Wells MW-1 and MW-2 were installed in areas upgradient of plant operations and are located to yield samples which are representative of background conditions at the facility. Wells MW-3, MW-4, and MW-5 were installed in areas downgradient from known by-product waste disposal areas at the site. These well locations were selected to determine whether or not groundwater has been impacted from the land disposal of by-product wastes in these areas. Wells MW-6 through MW-10 are located in the vicinity of Nucor Creek, Nucor Swamp, and Nucor Pond. These wells are intended to detect groundwater impact from the infiltration of contact cooling water discharged into Nucor Creek and from the land disposal of by-product wastes in these areas.

The depths of the wells installed range from six and one-half feet to thirty-five feet below land surface. Monitoring wells MW-3, MW-9, and MW-10 were installed using a four-inch diameter stainless steel hand auger. The remaining wells were installed using a drill rig equipped with a six and one-half inch inside diameter hollow stem auger. During the installation of each well, subsurface soil samples were collected at five foot intervals and lithologically classified by a GEL hydrogeologist. The soils encountered at the site were comprised of a fine grained silty sand. However, the soils encountered at monitoring well locations MW-5 and MW-7 contained black sludge and other fill material. During the construction of the wells, no geologic strata which could be considered confining units (aquitards) were encountered.

Following installation, the wells were developed using a combination of bailing, pumping, and surging techniques.

V. SITE SURVEY AND GROUNDWATER FLOW

Following the installation of the monitoring wells, the measuring points of the wells were surveyed by a South Carolina registered land surveyor. The measuring points, which were established on top of the well cover rims, were surveyed relative to a temporary bench mark established from United States Geological Survey data.

The depth to groundwater was measured in each well on June 18, 1991 by GEL personnel. These depth to groundwater measurements, along with the surveyed measuring

point elevations, were used to calculate the water table elevation, relative to mean sea level (msl) at each well location. The measuring point elevations, depth to groundwater measurements, and water table elevations, for wells MW-1 through MW-10 are summarized below.

<u>Monitoring Well</u>	<u>Measuring Point Elevation (ft msl)</u>	<u>Depth to Groundwater (ft)*</u>	<u>Water Table Elevation (ft msl)</u>
MW-1	160.66	25.72	134.94
MW-2	158.45	25.59	132.86
MW-3	139.55	6.63	132.92
MW-4	148.11	17.26	130.85
MW-5	147.30	10.66	136.64
MW-6	127.72	4.97	122.75
MW-7	125.29	4.84	120.45
MW-8	119.90	1.30	118.60
MW-9	122.70	5.27	117.43
MW-10	120.00	4.70	115.30

* Measured June 18, 1991

Based on the water table elevations determined for these wells, a potentiometric surface map was constructed. This map, included as Figure 3, shows the direction of groundwater flow in areas northeast of the plant is towards the east-northeast, in the direction of Black Creek. The direction of groundwater flow in areas southwest of the plant is towards the south-southwest, in the direction of Lucas Creek. This groundwater flow divide is consistent with surface topography in the area, as there is a northeast-southwest trending knoll on which the Nucor plant is located.

VI. GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples were collected on June 18, 1991 from monitoring wells MW-1 through MW-10 and analyzed for the following parameters:

- Arsenic
- Cadmium
- Chromium
- Copper
- Lead
- Nickel
- Zinc
- Polynuclear Aromatic Hydrocarbons

The parameter list includes the metals and organic compounds which were detected at elevated concentrations in soil samples collected as part of the preliminary site assessment conducted at the site in August, 1990. The PAH analysis includes sixteen semi-volatile organic compounds that are accepted indicators of impact from waste oils.

Groundwater samples were also collected on August 27, 1991 from wells MW-5, MW-7, MW-8 and MW-9, and analyzed for the same metal constituents as above to confirm the analytical results from the June 18 sampling period. The metals analyses for the samples collected on August 27, 1991 were performed on both the total recoverable (unfiltered) and the dissolved (filtered) fractions. The collection procedures and the results of the analysis of groundwater samples collected during both sampling events, are described below.

A. Sampling Procedures

All procedures used during groundwater sample collection were performed in accordance with the Environmental Protection Agency (EPA) and DHEC accepted protocols, and as specified in the approved groundwater assessment plan. Techniques used for well evacuation, sample collection, and measurement of water table depth were designed to insure that representative groundwater samples were collected and accurate field measurements were made.

Prior to sample collection, the volume of water in each well casing was calculated, after which at least three casing volumes of groundwater were evacuated using a steam cleaned Teflon™ bailer attached to a new polyethylene line. Field measurements of pH and specific conductivity were made during the evacuation procedure. Evacuation continued until measurements of pH and conductivity stabilized.

Groundwater samples were collected in a manner which insured that the sample was not altered or contaminated during withdrawal from the well and introduction to the sample container. Sampling personnel wore a pair of new, laboratory quality PVC gloves during all sample collection activities and changed gloves prior to sampling the next well. The samples were slowly poured directly from the bailer into each sample container to further minimize the potential for alteration of the sample. The samples collected for dissolved metals analyses were filtered using a 0.45 micron filter, prior to introduction to the sample containers. After filling, collection personnel placed the sample containers immediately into a clean sample cooler and covered them with ice packs.

Samples remained in the custody of GEL personnel throughout the collection process and transportation to the laboratory. Upon arrival at the laboratory, sampling personnel relinquished the samples to laboratory personnel who logged them into the laboratory. Chain of Custody was maintained for all samples from the time of collection through the completion of the analyses.

B. Analytical Results

The Certificates of Analysis for groundwater samples collected during sampling events on June 18, 1991 and August 27, 1991 are included in Appendix II. A summary of the analytical results for groundwater samples collected during both sampling events, are included in Tables 1 and 2 and are discussed below.

As previously discussed, wells MW-1 and MW-2 are thought to be located in areas representative of background conditions at the facility. The concentration of constituents detected in groundwater samples collected from wells MW-3 through MW-10 were compared to the background conditions and existing MCLs for each respective constituent. However, for those constituents with no existing MCLs, analytical results were compared to the respective proposed MCL or secondary MCL. Secondary MCLs primarily affect the aesthetic qualities relating to potable water.

The analytical results for the groundwater samples collected on June 18, 1991 indicate that concentrations of compounds exceeding background levels of at least one constituent were detected in the samples collected from each well sampled, and exceeded South Carolina Class GB MCLs in the groundwater samples collected from wells MW-5, MW-7, MW-8, and MW-9. These results are summarized in Table 1.

The groundwater samples collected on June 18 were noted to be turbid. Therefore, it was suspected that metals contained in aquifer solids present in the analyzed samples contributed to the elevated concentrations of metals. Due to the turbidity all wells were redeveloped on August 26, 1991. To confirm the presence or absence of elevated metals concentrations, the wells with metals concentrations exceeding MCLs were resampled on August 27, 1991. These wells were MW-5, MW-7, MW-8, and MW-9.

The samples collected on August 27, 1991 were submitted to the laboratory and analyzed for total recoverable (unfiltered) and dissolved metals (filtered), in addition to turbidity. These results show that concentrations of at least one constituent in the unfiltered samples exceed background levels in all four wells that were resampled. Concentrations of arsenic, chromium and lead exceeded MCLs for these metals in the unfiltered groundwater

sample collected from well MW-5. In addition, secondary MCL concentrations were exceeded for copper, and the proposed MCL for nickel was exceeded in the unfiltered groundwater sample collected from well MW-5. However, analysis of a filtered groundwater sample collected from well MW-5 detected only concentrations of arsenic and lead above their respective MCLs.

Analysis of an unfiltered groundwater sample collected from well MW-7 detected chromium above the MCL for this constituent. However, there were no dissolved concentrations which exceeded MCLs in the groundwater sample collected from well MW-7.

Analysis of both the filtered and unfiltered samples collected from wells MW-8 and MW-9 failed to detect any metal concentrations above the respective MCLs. The metal concentrations detected in these wells approached background levels following redevelopment.

VII. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this groundwater investigation conducted at the Nucor Steel facility in Darlington, South Carolina, groundwater in the area of the former cooling water pond (MW-5) is impacted with concentrations of arsenic, chromium and lead above South Carolina Class GB MCLs. However, analysis of a filtered groundwater sample collected from well MW-5 detected only concentrations of arsenic and lead above their respective MCLs. Copper and nickel concentrations detected in the unfiltered groundwater sample collected from this well exceeded the secondary MCL and proposed MCL for these constituents respectively.

Analysis of an unfiltered groundwater sample collected from well MW-7, located in the vicinity of Nucor Creek, indicates that groundwater in this area is impacted with elevated concentrations of chromium. However, analysis of the filtered sample collected from this well failed to detect concentrations of any of the metals analyzed at concentrations significantly above quantitation limits.

Concentrations of metals above background levels were detected in the groundwater samples collected from monitoring wells MW-3 through MW-10. However, because of the amount of fill materials in the areas of each of these wells, the samples collected were very turbid, and as a result these analyses are not indicative of significant impact.

Of the groundwater samples collected from wells MW-3 through MW-10 as part of the first round of sampling, samples collected from wells MW-8 and MW-9 showed the

most significant metals impact. Analysis of a second round of unfiltered samples, collected after redevelopment from wells MW-8 and MW-9, detected much lower concentrations which approached background levels. Based on this data, with the exception of wells MW-5 and MW-7, it is believed that although elevated metals concentrations were detected in unfiltered samples collected from the monitoring wells installed at the facility, the metals impact to groundwater in the areas in which these wells are located is not significant.

Analysis of groundwater samples collected from the monitoring wells detected no PAH constituents. However, analysis for PAH of a sample of groundwater collected from well MW-7 will be required to confirm this. The absence of odors and visible indications of impact in groundwater samples collected from these wells indicates that groundwater underlying the site is not impacted with lubricants and oils.

Based on the results of this investigation, the following recommendations are made:

- Install two additional monitoring wells downgradient from the former cooling pond and waste disposal area in order to determine the horizontal extent of groundwater impact detected in well MW-5. These wells will be developed and sampled for metals.
- Install one monitoring well in the area thought to be the former location of a former cooling pond.
- Redevelop well MW-7 using a positive displacement bladder pumping system to lower turbidity. Resample and analyze samples for metals and PAH.
- Install one stratigraphic borehole in an area upgradient of the plant near well MW-1. The purpose of this borehole is to determine the stratigraphy of the uppermost aquifer and to determine the presence and depths of confining units underlying the site.
- Determine aquifer characteristics including hydraulic conductivity and groundwater flow velocity in the vicinity of the Nucor site by performing slug tests on a minimum of three of the monitoring wells. This testing will provide additional data on the migration and fate of any elevated concentrations of metals detected.

The locations of the proposed monitoring wells are shown on Figure 3 and the well installation details are included in Appendix III. This report serves as a formal request for DHEC approval for installation of these wells.

Ref. 5

2000 10 10 Pg

0 = null

SECTION 2

PROCESS DESCRIPTION

Nucor Steel is a secondary steel production facility with a capacity to produce 520,000 tons of low carbon steel per year. The facility contains five electric arc furnaces (EAF), one ladle metallurgical facility (LMF), two continuous casters, and two reheat furnaces. The final product is rolled low carbon steel in various shapes. Approximately 475,000 tons of steel is produced in rolled form; the balance may be shipped or sold to other steel facilities.

2.1 Steel Production Process

Steel scrap is received at the plant by rail and truck and is stock piled for future use. The steel scrap is transferred to a precharging area and to charging buckets by magnetic crane.

Each EAF is operated by batch process. The scrap steel is placed in a charging bucket and weighed prior to charging. The charging bucket is hoisted above the open EAF vessel, is opened at the bottom, and the charge material is dumped into the vessel. After charging the EAF, the roof is swung back into place over the furnace vessel and seated. The arc is struck between three electrodes that are triangularly arranged. As the process or "melt" begins, the electrodes bore down through the scrap steel, melting material as they descend to form a pool of molten metal at the bottom of the furnace. This pool of metal increases in size as the melt continues and allows unmelted scrap to "collapse" into the molten pool. At some point during the melt cycle the current is shut off, the electrodes retracted, and the roof swung away for an additional charge of material. The scrap material is dropped into the pool of molten metal, the roof is swung back into position and sealed, the electrodes are extended back into the furnace, and the current is switched on to continue the melt cycle. This procedure may be repeated for one or more additional charges. Any

required alloying materials and limestone may be added to the furnace after the last charge. Near the end of the melt cycle, an oxygen lance may be used to oxidize residual impurities (i.e., carbon) in the molten steel.

The EAF is tapped by retracting the electrodes, swinging the furnace roof away, and tilting the furnace vessel so that the molten material can exit through a pouring spout. The molten steel is poured into a preheated ladle which is removed at the end of the tap by overhead crane. If additional refining is required, the ladle is moved to the LMF for addition of limestone and alloys, and further melting to produce structural grade steel.

The continuous casting machine receives the ladle from the tapped furnace or the LMF. The ladle is tapped from the bottom, which allows casting of only the molten steel. After the steel has been drained, the slag layer is dumped in a slag area to be cooled. The steel billets exiting the caster are cut to a convenient length and cooled in a holding area.

Cold steel billets are heated in a reheat furnace to prepare them for rolling. The hot billets are rolled into various steel shapes and prepared for final processing in the rolling mills.

2.2 Furnace Operations

Figure 1 shows the general process flow and furnace configuration for Nucor Steel. The furnace operations are located in a long metal building that runs roughly north and south. The "old shop" area, or No. 1 melt shop, contains EAF Nos. 1 through 3 and the LMF and is located in the north end of the building. EAF Nos. 1 through 3 have a rated capacity of 30 tons per heat and a heat cycle of approximately 2 hours 15 minutes. These units were constructed in 1969 to 1973. Emissions from the furnaces are controlled during melting by side draft hoods vented to a positive pressure shaker type baghouse (Baghouse No. 1). Emissions during charging and tapping of these EAF's are uncontrolled. The fugitive emissions escape from the building through roof vents.

nucor steel

A Division of NUCOR Corporation

Post Office Box 525 Darlington, South Carolina 29532 Telephone 803/393-5841

November 26, 1984

Ref. 6

RECEIVED

DEC 6 1984

S. C. DEPT. OF HEALTH AND
ENVIRONMENTAL CONTROL
Bureau of Solid & Hazardous
Waste Management

S. C. Dept. of Health & Envir. Control
2600 Bull Street
Columbia, S. C. 29201

ATTN: MR. J. KENDAL

Dear Mr. Kendal:

RE: APPLICATION FOR PERMIT TO DISPOSE OF INERT, NON-BURNABLE,
NON-TOXIC WASTES BY EARTH BURIAL, SECTION IV OF
REGULATION PC SW-2

Please find enclosed a completed application cover sheet and topographic map for permit application to authorize Nucor Steel, Darlington Division, to operate a landfill within the plantsite boundary, as discussed in the letter dated October 16, 1984, by W. James Kelly, District Solid Waste Consultant.

It is proposed that the landfill will be used for the disposal of inert, non-toxic materials such as broken concrete, crushed stone and excavation dirt. The landfill area is presently a cleared site, well within the northeastern corner of the plantsite, and 30-40 feet above the water table. The north, south and east sides of the fill area are bounded by old equipment storage areas, while the west side is bordered by an open slag processing facility. No buildings are situated adjacent to the landfill area.

Being within the plantsite, promiscuous dumping is completely prevented, since access is only available to authorized personnel via the guard shack at the front gate. The actual landfill area is further isolated by a chain link fence.

It is estimated that approximately 100 cubic feet of fill will be deposited per week, the expected life of the area to be several years.

(Continued)

NUCOR

S.C. DHEC
Mr. J. Kendal
November 26, 1984

Page 2

I would like to take this opportunity to thank Mr. James Kelly for his advice and cooperation in this matter. If you have any questions or require further information, please don't hesitate to call (803) 393-5841, extension 147.

Yours very truly,

Mark D. Millett

Mark D. Millett
Chief Metallurgist

MDM/mz

Enclosures

cc: W. James Kelly
W. E. Dauksch
P. Spivey

DWH *AR25C*
nucor steel

A Division of NUCOR Corporation

Post Office Box 525 Darlington, South Carolina 29532 Telephone 803/393-5841

Ref. 7 **RECEIVE**

JUN 6 1991

S. C. DEPT. OF HEALTH
ENVIRONMENTAL CONTROL
Bureau of Solid & Hazardous
Waste Management

June 4, 1991

Dewey H. Pearson, Jr.
Manager Solid Waste Permitting
South Carolina Department of
Health & Environmental Control
Bureau of Solid & Hazardous
Waste Management
2600 Bull Street
Columbia, SC 29201

Dear Mr. Pearson:

Due to physical changes at Nucor Steel, we find that we must relocate our present landfill site to another area. We ask for your permission to continue using the old landfill site for approximately three (3) months so that we can have the area surveyed and complete all requirements for a permit.

Sincerely,

Howard W. Petrie

Howard W. Petrie
Safety Coordinator

HWP/jm

Ref. 8

SOUTH CAROLINA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL CONTROL
COLUMBIA, SOUTH CAROLINA
APPLICATION FOR PERMIT TO CONSTRUCT
SOLID WASTE MANAGEMENT SYSTEM

Date of Application JULY 26, 1991 County DARLINGTON

Name of Project (Location and Description) RENEWAL OF LANDFILL PERMIT
FOR ON-SITE LANDFILL AT NUCOR STEEL, DARLINGTON, S.C.

Nearest Landfill (Name and Location) DARLINGTON COUNTY LANDFILL
LANDFILL ROAD (OFF U.S. HWY 52) DARLINGTON, S.C. 29532

Type(s) and Amount(s) of Waste(s) Generated SEE ENCLOSED COVER LETTER
BROKEN CONCRETE, EXCAVATION DIRT, CRUSHED STONE, ~ 150 cu.ft. / WEEK, REFRACTORY MATERIALS --
~ 300 cu. yds. / YEAR, HEAVY GREASE / DIRT MIXTURE ~ 100 cu. yds. EVERY SIX MONTHS --

This application is being made on behalf of NUCOR STEEL
(Company)

whose address is Box 525, Hwy 52, DARLINGTON, S.C. 29532

An engineering report consisting of plans, specifications, process flow sheets with sufficient data for a material and/or heat balance (where applicable), products manufactured, laboratory analyses of waste(s), and analyses of alternative methods of disposal is herewith submitted and made part of this application.

Designing Engineer

(Address)

(Phone)

Company Official Directly Responsible
Walter E. Postholywait

CHIEF METALLURGIST
(Official Title)
(803) 393-5841
(Phone)

Application No. _____

File in Quadruplicate.

DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF WASTEWATER & STREAM QUALITY CONTROL
WASTELOAD ALLOCATION REQUEST

Ref. 9

TO: Water Quality Analysis Section
Environmental Analysis Division

FROM: NAME: Michael Young
SECTION: Industrial

DATE: 11/9/87

1. Name of Discharger: Nucor Steel
2. NPDES Permit No.: SC0035238
3. Receiving Waters: Lucas Branch to Black Creek (Class B)
4. Tributary to Stream/River: Pee Dee River
5. Description of Point of Discharge: Cafeteria and Sanitary wastewater w/ treatment by extended aeration activated sludge system (package plant)
6. A Location Map is Required. Is it Attached? Yes ☐ No ☒
7. Subbasin: 03-07-25 County: Darlington
8. Discharge Information:

Parameter	Permitted Limit	Proposed Limit
a. Flow (MGD)	<u>10,000 GPD</u>	<u>10,000 GPD</u>
b. BOD ₅ (mg/l)	<u>30</u>	<u>30</u>
c. NH ₃ (mg/l)	<u> </u>	<u> </u>
d. D.O. (mg/l)	<u>4</u>	<u>4</u>
e. T. phos. (mg/l)	<u> </u>	<u> </u>
f. Other parameters in the discharge: <u>TSS, Fecal Coliform, pH +</u> <u>TRC</u>		

9. Discharge Category (circle appropriately)

- a. a. 201 facilities project: step I; II; III; completed 201 project.
- b. New discharge permit.
- c. Information request to evaluate discharge feasibility.
- ☒ d. Permit reissuance.

(1) Permit expiration date: 4/30/88

10. Additional Information:

- a. Was a Preliminary Engineering Report completed? Yes ☐ No ☒
- b. Is there a District Engineer's Report on the project? Yes ☐ No ☒

11. Date WLA is Needed: 12/14/87

12. Other Comments: Flow: 10,000 GPD

South Carolina Department of Health and Environmental Control

Ref. 10

2600 Bull Street
Columbia, S.C. 29201

Commissioner
Robert S. Jackson, M.D.



Board
Moses H. Clarkson, Jr., Chairman
Gerald A. Kaynard, Vice-Chairman
Oren L. Brady, Jr., Secretary
Barbara P. Nuëssle
James A. Spruill, Jr.
William H. Hester, M.D.
Euta M. Colvin, M.D.

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

September 11, 1986

Mr. Neil Magruder, Controller
Nucor Steel
Post Office Box 525
Darlington, S.C. 29532

RE: Nucor Steel
NPDES Permit #SC0035238
Darlington County

Dear Mr. Magruder:

Enclosed is a completely executed copy of Consent Order #86-86-W for your files.

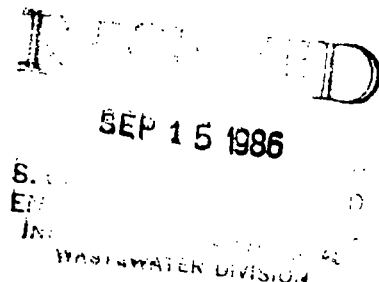
Sincerely,

A handwritten signature in cursive script that reads "Jack W. Wilkinson".

Jack W. Wilkinson
Environmental Quality Manager
Water Quality Assessment
& Enforcement Division

JWW/sl

cc: Steve Thomas
District
Andy Yasinsac ✓
Jack Yeager
Sam Grant
EPA



STATE OF SOUTH CAROLINA
BEFORE THE DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

IN RE: Nucor Steel Corporation
NPDES Permit #SC0035238
Darlington County

CONSENT ORDER
86-86-W

Nucor Steel Corporation (Respondent) owns, operates and is responsible for a waste treatment facility in Darlington County, South Carolina.

The Discharge Monitoring Reports submitted by the Respondent to the South Carolina Department of Health and Environmental Control (Department) and the Department's Compliance Sampling and Operation and Maintenance Inspections have identified that the Respondent's wastewater treatment facility has consistently failed to achieve compliance with required National Pollutant Discharge Elimination System (NPDES) permit limits.

As a result of a meeting of the Respondent and the Department held in Columbia, South Carolina, on July 23, 1986, both parties agreed to the requirements set forth in this Consent Order.

Findings of Fact

1. The Respondent owns, operates and is responsible for a waste treatment facility and is permitted by the Department to operate in accordance with NPDES permit #SC0035238.
2. Discharge Monitoring Reports submitted since January 1985 to present, contained numerous instances of failure to comply with the final effluent criteria contained in the Respondent's NPDES permit.
3. Since January 1985, two Department Compliance Inspections and three Operation and Maintenance Inspections have been accomplished. These reports indicate unsatisfactory operating conditions and failure to

achieve final effluent conditions.

4. As a result of discussions at the conference it was determined that a proper method of sludge handling was needed.

Conclusions of Law

1. The Respondent is in violation of Section 48-1-90 of the Pollution Control Act of 1976, Code of Laws of South Carolina, as amended, in that it discharged wastewater into the environment in a manner which is not in compliance with its NPDES permit.
2. The Respondent is in violation of Section 48-1-110 of the Pollution Control Act of Code of Laws of South Carolina, in that it has operated a waste disposal facility in violation of the conditions of the NPDES permit issued by the Department.
3. The Respondent is liable for civil penalties under Section 48-1-330 of the Pollution Control Act of the 1976 Code of Laws, as amended, in that effluent limits have been contravened and proper operation and maintenance, as required by NPDES permit, has not been provided to ensure treatment capabilities are maximized.

NOW, THEREFORE, IT IS ORDERED, CONSENTED TO AND AGREED, pursuant to 1976 Code Section 48-1-50, as amended, that the Respondent shall:

1. Operate and maintain facility to maximize treatment capabilities.
2. Submit to the Department monthly process control report beginning September 15, 1986, through February 15, 198⁷, including the following tests and calculations:
 - a. Settrometer - daily
 - b. Sludge blanket depth - daily
 - c. Dissolved oxygen profile in the aeration basin - daily
 - d. Microscopic examination - one every 2 weeks
 - e. Mixed Liquor Suspended Solids (MLSS) - twice per week
 - f. Select and utilize at least one of the following three

activated sludge process control techniques:

<u>Control Technique</u>	<u>Frequency</u>	<u>Determination</u>
Constant F:M	2/week	Based on 5 day moving avg.
Constant MLVSS	2/week	Volatile solids inventory
Constant MCRT	2/week	Based on 3 to 5 day moving avg.

F:M = Food to Microorganism Ratio
MLVSS = Mixed Liquor Volatile Suspended Solids
MCRT = Mean Cell Residence Time

Utilize the data generated in the above tests to make necessary operation and maintenance corrections to assure optimum treatment.

3. Have certified engineer submit to the Department on or before September 15, 1986, a flow monitoring system to include an approvable proposal for equalization of flow.
4. Submit to the Department on or before September 15, 1986, a method of sludge disposal.
5. Immediately pay to the Department a civil penalty of four thousand dollars (\$4,000.00).

IT IS ^{per}FURTHER ORDERED AND AGREED that failure to comply with any provision of this Order shall be grounds for appropriate sanctions and further enforcement action.

THE SOUTH CAROLINA DEPARTMENT OF
HEALTH AND ENVIRONMENTAL CONTROL

BY:

Michael D. Jarrett
Michael D. Jarrett
Acting Commissioner

BY:

Robert G. Gross
Robert G. Gross, Chief
Bureau of Water Pollution Control

DATE: September 8, 1986

WE CONSENT:

D. Cecil Magruder
Controller for Nucor Steel Corporation

Date: September 2, 1986

Dwight W. Weaver
Water Quality Assessment and Enforcement
Division

Date: 4 September 1986

Carlisle Roberts, Jr.
Attorney for the Department

Date: 9/8/86

Instructions for completing
this Form on reverse side.

HAZARDOUS WASTE INFORMATION

Ref. 11

(1) Name of generator: NUCOR STEEL

(2) Place of generation: DARLINGTON COUNTY

(3) General description of hazardous waste, including process producing waste:

ELECTRIC ARC FURNACE FUME THAT
IS CAPTURED BY A BAG HOUSE.

(4) Description of the hazardous waste: THE DUST IS

MOSTLY IRON OXIDE BUT HAS OXIDES
OF OTHER METALS PRESENT. Si,
Ca, Zn, Pb, Cr, Cu, ETC.

(5) Check the hazardous waste characteristics the waste exhibits as identified in Section C of the Emergency Hazardous Waste Regulation; or if the waste is listed as a hazardous waste, check "Listed"; or if the waste has been declared hazardous by the generator, check the hazardous waste characteristic(s) as identified in Section C of the Emergency Hazardous Waste Regulation the generator suspects the waste to exhibit.

- (a) Ignitable ☐ (b) Corrosive ☐ (c) Reactive ☒ (d) Toxic ☐ (e) Listed ☐

(6) Attach any information obtained from the testing of the waste performed to determine their hazard. If the generator declares the waste to be hazardous attach information on what basis the decision to declare the waste hazardous was made.

(7) Estimated amount of the waste produced per year in pounds (pounds/waste):

12,000,000.

(8) Describe the method(s) by which this waste is currently being treated, stored, or disposed, including the name and address of any facility to which the waste is being sent.

IT IS PRESENTLY BEING DISPOSED
OF IN THE COUNTY DUMP.

(9) Certification: I hereby certify (or declare) that the information provided herein is complete and correct to the best of my knowledge. I understand that all information on this Form may be made available to the public except those portions entitled to confidentiality as provided by Section 6B of the South Carolina Hazardous Waste Management Act. I am authorized to sign official documents for the generator named in (1) above.

[Signature]
Signature

Division Controller

Name and Title

December 17, 1979

Date

NOTE: Additional copies of this Form may be reproduced locally as needed.

Handed -
LCM
6-26-84
30-50'
nucor steel

A Division of NUCOR Corporation

Post Office Box 525 Darlington, South Carolina 29532 Telephone 803/393-5841

April 10, 1984

Ms. Melissa J. Johnston
Facility Compliance Section
Bureau of Solid and Hazardous Waste Management
South Carolina Dept. of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

SUBJECT: CLOSURE PLAN & WASTE PILE COMPLIANCE PROPOSAL

Dear Ms. Johnston:

We have removed approximately 90% of the baghouse pelletized dust waste pile. We will complete the removal of this material and any contaminated ground within 60 days, (no later than July 11, 1984). After the baghouse dust material and any contaminated dirt have been removed, we will take three samples of the ground from separate locations where the pile had been and send them to Environmental Testing, Inc., for analysis.

Environmental Testing, Inc., will use the nitric acid digestion technique to determine total lead and cadmium in these samples. If this value is less than that required by the 24-hour leach test for toxicity, it is sure that the ground area under the pile has been cleaned up. If it fails, then the 24-hour leach test for toxicity will be performed on the samples. If they fail this test, more dirt will be removed until representative samples pass testing,

As soon as the site is cleaned up, no other dust or pellets will be stored on the ground. We will install a concrete holding area with a cover and with no water run-in or run-off possible. Any storage of pellets will be done in this area. Dust will be stored in the existing elevated, covered tank. All stored material will be removed within 90 days of the time it went into storage. The elevated tank must be emptied regularly as it is too small to hold more than about one week's production of dust. The concrete holding area will also be too small to hold more than a week or two worth of dust production. This will insure the timely removal of the material.

Sincerely,

Wm E Dauksch

William E. Dauksch
Department Manager
Melting & Casting

WED/mz

NUCOR

RECEIVED

ENVIRONMENTAL
CONTROL
LABORATORY
WED 4/10/84

Ref. 14

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY: Dixie Cup Co.	COUNTY:	AQUIFER:	SCWRC: 17L--z01
CONTACT: PHONE:	LONGITUDE: 79-52-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-17-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Connolly;	LOCATION: Darlington		

COMPANY: Hartsville Oil Mill	COUNTY:	AQUIFER:	SCWRC: 19K--z01
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab;	LOCATION: Hartsville		

COMPANY: Hartsville Oil Mill	COUNTY:	AQUIFER:	SCWRC: 19K--z02
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab;	LOCATION:		

COMPANY: Sonoco Corp.	COUNTY:	AQUIFER:	SCWRC: 19K--z03
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Garland; Flows;	LOCATION: Hartsville		

COMPANY: Sonoco Corp.	COUNTY:	AQUIFER:	SCWRC: 19K--z04
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Garland; Flows;	LOCATION: Hartsville		

NOTE: LATITUDES OR LONGITUDES ENDING IN 95 ARE ONLY ACCURATE TO WITHIN 5 MINUTES.
LATITUDES OR LONGITUDES ENDING IN 91 ARE ONLY ACCURATE TO WITHIN 1 MINUTE.

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY: Sonoco Corp.	COUNTY:	AQUIFER:	SCWRC: 19K--z05
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Garland; Flows;	LOCATION: Hartsville		

COMPANY: Sonoco Corp.	COUNTY:	AQUIFER:	SCWRC: 19K--z06
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Garland; Flows;	LOCATION: Hartsville		

COMPANY: Sonoco Corp.	COUNTY:	AQUIFER:	SCWRC: 19K--z07
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Garland; Flows;	LOCATION: Hartsville		

COMPANY: Sonoco Crop.	COUNTY:	AQUIFER:	SCWRC: 19K--z08
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Garland; Flows;	LOCATION: Hartsville		

COMPANY: City of Hartsville	COUNTY:	AQUIFER:	SCWRC: 19K--z09
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 175.00	
REMARKS: SCWRC Well tab; DC:Layne-Atlantic; T=64;	LOCATION:		

NOTE: LATITUDES OR LONGITUDES ENDING IN 95 ARE ONLY ACCURATE TO WITHIN 5 MINUTES.
LATITUDES OR LONGITUDES ENDING IN 91 ARE ONLY ACCURATE TO WITHIN 1 MINUTE.

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY: City of Hartsville	COUNTY:	AQUIFER:	SCWRC: 19K--z11
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 175.00	
REMARKS: SCWRC Well tab; DC:Layne-Atlantic; T=64;	LOCATION:		

COMPANY: Carolina Utilities	COUNTY:	AQUIFER:	SCWRC: 17L--z02
CONTACT: PHONE:	LONGITUDE: 79-52-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-17-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; WS; PT:28;	LOCATION: Darlington		

COMPANY: Carolina Utilities	COUNTY:	AQUIFER:	SCWRC: 17L--z03
CONTACT: PHONE:	LONGITUDE: 79-52-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-17-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Hughes Wells; 30ft cavity rept...;	LOCATION: Darlington		

COMPANY: Darlington Bank &	COUNTY:	AQUIFER:	SCWRC: 17L--z04
CONTACT: PHONE:	LONGITUDE: 79-52-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-17-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; Flows of 10 gpm;	LOCATION: Trust Co.		

COMPANY: Mr. L.G. O'Neal	COUNTY:	AQUIFER:	SCWRC: 19K--z12
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:B. Moore;	LOCATION: .6 mi. NE Hartsville		

NOTE: LATITUDES OR LONGITUDES ENDING IN 95 ARE ONLY ACCURATE TO WITHIN 5 MINUTES.
LATITUDES OR LONGITUDES ENDING IN 91 ARE ONLY ACCURATE TO WITHIN 1 MINUTE.

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY: Ernest L. Jordan	COUNTY:	AQUIFER:	SCWRC: 18K--z01
CONTACT: PHONE:	LONGITUDE: 79-57-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Jess Spiers; T=65; Flows;	LOCATION: 2.5 mi. W Boveville		

COMPANY: City of Hartsville	COUNTY:	AQUIFER:	SCWRC: 19K--z13
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; DC:Layne-Atlantic; Test Well;	LOCATION:		

COMPANY: Darlington Mfg. Co.	COUNTY:	AQUIFER:	SCWRC: 17L--z05
CONTACT: PHONE:	LONGITUDE: 79-52-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-17-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab;	LOCATION:		

COMPANY: Nucor Steel	COUNTY:	AQUIFER:	SCWRC: 17K--z01
CONTACT: PHONE:	LONGITUDE: 79-52-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; USGS Well files; DHEC;	LOCATION: Darlington		

COMPANY: Nucor Steel	COUNTY:	AQUIFER:	SCWRC: 17K--z02
CONTACT: PHONE:	LONGITUDE: 79-52-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: DHEC;	LOCATION: Darlington		

NOTE: LATITUDES OR LONGITUDES ENDING IN 95 ARE ONLY ACCURATE TO WITHIN 5 MINUTES.
LATITUDES OR LONGITUDES ENDING IN 91 ARE ONLY ACCURATE TO WITHIN 1 MINUTE.

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY: Hartsville Well Fld	COUNTY:	AQUIFER:	SCWRC: 19K--z14
CONTACT: PHONE:	LONGITUDE: 80-02-95	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-22-95	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: SCWRC Well tab; USGS Obs. Well; T:18Flowing;	LOCATION: #2		

COMPANY: Kelly's Country Kit.	COUNTY:	AQUIFER:	SCWRC: 17K--y01
CONTACT: PHONE:	LONGITUDE: 79-54-22	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-20-52	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 1.85 MILES SSW	ELEV: 170.00	
REMARKS: DHEC;	LOCATION: Darlington		

COMPANY: Magnolia Trailer Pk.	COUNTY:	AQUIFER:	SCWRC: 17L--g01
CONTACT: PHONE:	LONGITUDE: 79-53-91	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-18-91	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: DHEC;	LOCATION:		

COMPANY: Magnolia Trailer Pk.	COUNTY:	AQUIFER:	SCWRC: 17L--g02
CONTACT: PHONE:	LONGITUDE: 79-53-91	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-18-91	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 0.00 MILES UNK	ELEV: 0.00	
REMARKS: DHEC;	LOCATION:		

COMPANY: Yardborough Trailer	COUNTY:	AQUIFER:	SCWRC: 17L--d01
CONTACT: PHONE:	LONGITUDE: 79-53-26	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-19-19	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 3.64 MILES SSE	ELEV: 160.00	
REMARKS: DHEC;	LOCATION: Park		

NOTE: LATITUDES OR LONGITUDES ENDING IN 95 ARE ONLY ACCURATE TO WITHIN 5 MINUTES.
LATITUDES OR LONGITUDES ENDING IN 91 ARE ONLY ACCURATE TO WITHIN 1 MINUTE.

Date: 10/06/92

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTESITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES

THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY: Swink's Trailer Park	COUNTY:	AQUIFER:	SCWRC: 17L--d02
CONTACT: PHONE:	LONGITUDE: 79-53-31	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-19-50	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 3.04 MILES SSE	ELEV: 62.00	
REMARKS: DHEC;	LOCATION: Darlington		
COMPANY: Wallace Mobile Home	COUNTY:	AQUIFER:	SCWRC: 17K--p02
CONTACT: PHONE:	LONGITUDE: 79-54-20	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-21-12	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 1.47 MILES SSW	ELEV: 172.00	
REMARKS: DHEC;	LOCATION: Park, Dovesville Hwy		
COMPANY: Landfill site	COUNTY:	AQUIFER:	SCWRC: 18K--s01
CONTACT: PHONE:	LONGITUDE: 79-56-00	COMP. DEPTH: 0	USE:
ADDRESS:	LATITUDE: 34-21-50	DRILL DEPTH: 0	YIELD: 0
	DISTANCE: 2.05 MILES WSW	ELEV: 181.00	
REMARKS: DHEC;	LOCATION: Darlington		
COMPANY: W.W. Kirven	COUNTY:	AQUIFER:	SCWRC: 18K--k01
CONTACT: PHONE:	LONGITUDE: 79-50-50	COMP. DEPTH: 50	USE: IR
ADDRESS:	LATITUDE: 34-22-30	DRILL DEPTH: -1	YIELD: 100
	DISTANCE: 3.01 MILES ENE	ELEV: -1.00	
REMARKS: Casing 0-40; Screen 40-50.	LOCATION: W.W. Kirven		
COMPANY: Dar. Co. Dev. W&S A.	COUNTY:	AQUIFER:	SCWRC: 17K--f01
CONTACT: PHONE:	LONGITUDE: 79-54-05	COMP. DEPTH: 480	USE:
ADDRESS:	LATITUDE: 34-23-41	DRILL DEPTH: 360	YIELD: -1
Dovesville,, SC	DISTANCE: 1.42 MILES NNW	ELEV: 160.00	
REMARKS:	LOCATION: Dovesville		

NOTE: LATITUDES OR LONGITUDES ENDING IN 95 ARE ONLY ACCURATE TO WITHIN 5 MINUTES.
LATITUDES OR LONGITUDES ENDING IN 91 ARE ONLY ACCURATE TO WITHIN 1 MINUTE.

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY: Perfection Gear Co.	COUNTY:	AQUIFER:	SCWRC: 17K--p01
CONTACT: PHONE:	LONGITUDE: 79-54-12	COMP. DEPTH: 280	USE: IN
ADDRESS: Darlington,, SC	LATITUDE: 34-23-31	DRILL DEPTH: 476	YIELD: -1
REMARKS: Date completed was 5/65.	DISTANCE: 1.25 MILES NNW	ELEV: 170.00	LOCATION: Darlington

COMPANY: Bethea Baptist Home	COUNTY:	AQUIFER:	SCWRC: 17L--u01
CONTACT: PHONE:	LONGITUDE: 79-50-91	COMP. DEPTH: 331	USE:
ADDRESS: Darlington,, SC	LATITUDE: 34-17-95	DRILL DEPTH: 300	YIELD: -1
REMARKS: Water is sampled once a mth by state mgn.	DISTANCE: 0.00 MILES UNK	ELEV: 138.00	LOCATION: Darlington

COMPANY: Mrs. J.B. Colbert	COUNTY:	AQUIFER:	SCWRC: 18K--h01
CONTACT: PHONE:	LONGITUDE: 79-57-23	COMP. DEPTH: 225	USE: DO
ADDRESS: Auburndale Farms Hartsville,, SC	LATITUDE: 34-23-37	DRILL DEPTH: 290	YIELD: 50
REMARKS: Date completed was 1954.	DISTANCE: 3.51 MILES WNW	ELEV: 155.00	LOCATION: Hartsville

COMPANY: W.W. Kirven	COUNTY:	AQUIFER:	SCWRC: 17K--k01
CONTACT: PHONE:	LONGITUDE: 79-50-50	COMP. DEPTH: 50	USE: IR
ADDRESS: ,	LATITUDE: 34-22-30	DRILL DEPTH: -1	YIELD: 100
REMARKS: Casing 0-40; Screen 40-50.	DISTANCE: 3.01 MILES ENE	ELEV: -1.00	LOCATION: W.W. Kirven

COMPANY: WILLIAM F HUDSON	COUNTY:	AQUIFER:	SCWRC: 17L--e01
CONTACT: W.F. HUDSON PHONE: 393-7748	LONGITUDE: 79-54-33	COMP. DEPTH: 39	USE: IR
ADDRESS: RT 5 BOX 24	LATITUDE: 34-19-12	DRILL DEPTH: -1	YIELD: 15
DARLINGTON, SC 29532	DISTANCE: 3.77 MILES SSW	ELEV: 171.00	LOCATION: 1.3M FROM HWY 52 N ON GILCHRIS
REMARKS:			

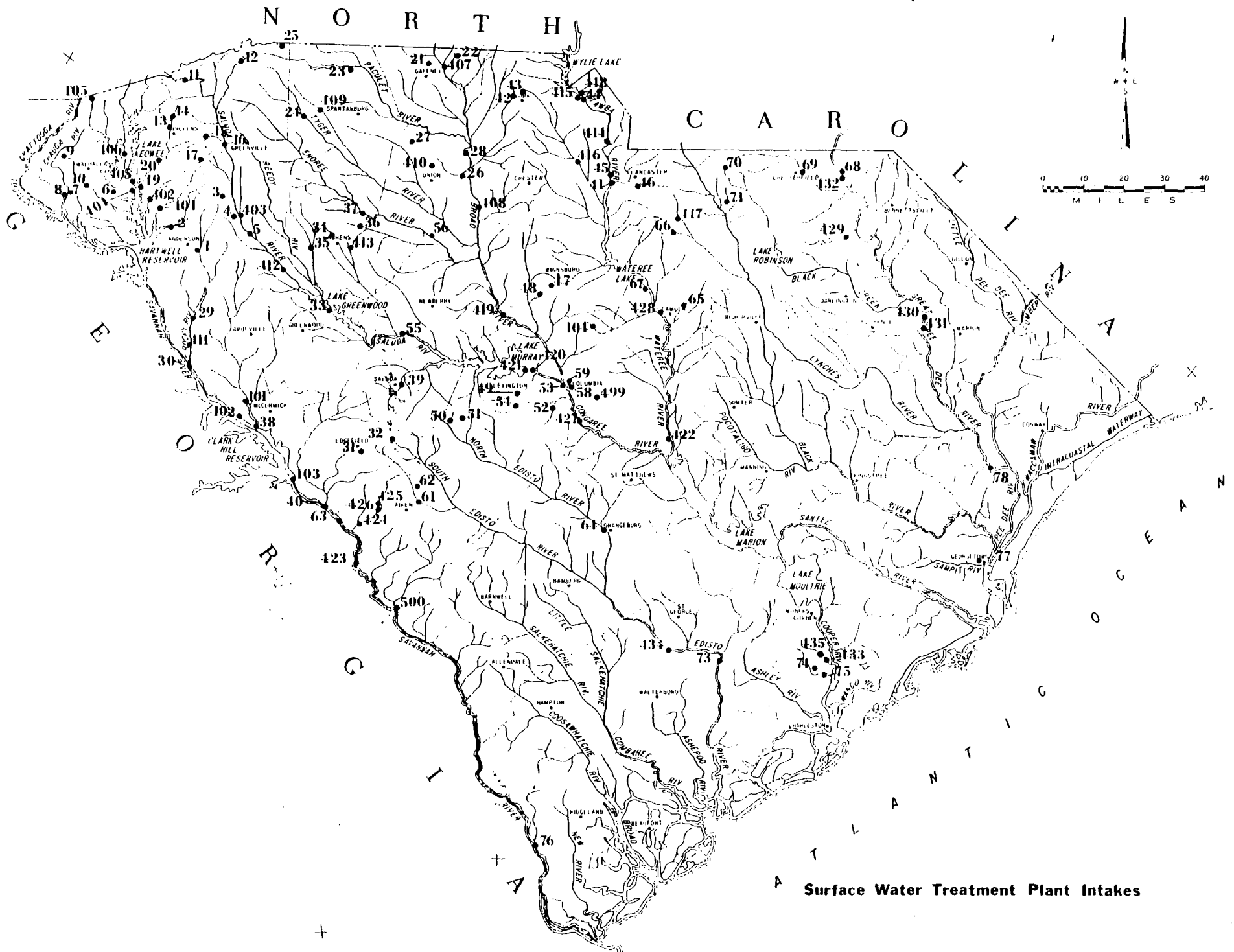
NOTE: LATITUDES OR LONGITUDES ENDING IN 95 ARE ONLY ACCURATE TO WITHIN 5 MINUTES.
LATITUDES OR LONGITUDES ENDING IN 91 ARE ONLY ACCURATE TO WITHIN 1 MINUTE.

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE
SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE
THE GROUNDWATER SUPPLIES FOUND WITHIN 4 MILES
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

COMPANY: Kirven Farm	COUNTY: Darlington	AQUIFER:	SCWRC: 16IR07G01
CONTACT: PHONE:	LONGITUDE: 79-50-50	COMP. DEPTH: 0	USE:
ADDRESS: Rt. 5, Box 110	LATITUDE: 34-22-30	DRILL DEPTH: 0	YIELD: 0
Darlington, SC 29532	DISTANCE: 3.01 MILES ENE	ELEV: 0.00	
REMARKS:	LOCATION:		
COMPANY: Kirven Farm	COUNTY: Darlington	AQUIFER:	SCWRC: 16IR07G02
CONTACT: PHONE:	LONGITUDE: 79-50-50	COMP. DEPTH: 0	USE:
ADDRESS: Rt. 5, Box 110	LATITUDE: 34-22-30	DRILL DEPTH: 0	YIELD: 0
Darlington, SC 29532	DISTANCE: 3.01 MILES ENE	ELEV: 0.00	
REMARKS:	LOCATION:		
COMPANY: Law Farm	COUNTY: Darlington	AQUIFER:	SCWRC: 16IR24G01
CONTACT: PHONE:	LONGITUDE: 79-55-40	COMP. DEPTH: 0	USE:
ADDRESS: Rt. 6, Box 207	LATITUDE: 34-19-20	DRILL DEPTH: 0	YIELD: 0
Darlington, SC 29532	DISTANCE: 3.92 MILES SSW	ELEV: 0.00	
REMARKS:	LOCATION:		
COMPANY: City of Darlington	COUNTY: Darlington	AQUIFER:	SCWRC: 16WS02G01
CONTACT: PHONE:	LONGITUDE: 79-54-12	COMP. DEPTH: 0	USE:
ADDRESS: Post Office Box 629	LATITUDE: 34-21-01	DRILL DEPTH: 0	YIELD: 0
Darlington, SC 29532	DISTANCE: 1.66 MILES SSW	ELEV: 0.00	
REMARKS:	LOCATION:		

NOTE: LATITUDES OR LONGITUDES ENDING IN 95 ARE ONLY ACCURATE TO WITHIN 5 MINUTES.
LATITUDES OR LONGITUDES ENDING IN 91 ARE ONLY ACCURATE TO WITHIN 1 MINUTE.

Ref. 15



I. MUNICIPAL

Public Water

SURFACE WATER TREATMENT PLANT INTAKES (By Number)

1. Anderson - Rocky River (Stand-by)
2. Anderson - Hartwell Reservoir
3. Williamston - Big Creek
4. Williamston - Camp Creek
5. Belton Honea Path - Saluda River
6. Seneca - Keowee Lake
7. Westminster - Ramsey Creek
8. Westminster - Chauga River
9. Walhalla - Walhalla Reservoir
10. Walhalla - Conocross Creek
11. Greenville - North Saluda Reservoir
12. Greenville - Table Rock Reservoir (South Saluda)
13. Pickens - Twelve Mile Creek
14. Pickens - Haygood Creek
15. Easley - Burdine Creek
16. Easley - Saluda River
17. Liberty - Eighteen Mile Creek
18. Delete
19. Clemson University - Hartwell Reservoir
20. Easley Norris W.D. - Twelve Mile Creek
21. Gaffney - Lake Welch
22. Blackburg - Buffalo Creek
23. Spartanburg - South Pacolet River
24. Greer - South Tyger River
25. Landrum - Vaughn's Creek
26. Union - Broad River
27. Jonesville - Rochester Lake
28. Lockhart - Broad River
29. Abbeville - Rocky River
30. Calhoun Falls - Savannah River
31. Edgefield - Slade Lake (Stand-by)
32. Johnston - First Branch Impoundment (Stand-by)
33. Greenwood - Lake Greenwood
34. Laurens - Reedy Fork Creek
35. Laurens - Rahon Creek
36. Clinton - Duncan Creek
37. Clinton - Enoree River
38. McCormick - Clarke Hill Reservoir
39. Saluda - Red Bank Creek (Stand-by)
40. Edgefield Co. W & S Auth. - Savannah River
41. Lancaster - Catawba River
42. York - Cardwell Lake (Turkey Creek)
43. York - One City Reservoir
44. Rock Hill - Catawba River
45. Chesterfield W.D. - Catawba River
46. Lancaster Co. W & S Dist. - Bear Creek
47. Winnsboro - Campbell Creek
48. Winnsboro - 192 Acre Lake
49. Lexington - Twelve Mile Creek
50. Batesburg - Lightwood Knot Creek

51. Batesburg - Duncan Creek
52. Cayce - Congaree Creek
53. West Columbia - Saluda River
54. Red Bank - Mill Pond (Red Bank Creek)
55. Newberry - Saluda River
56. Whitmire - Enoree River
57. Delete
58. Columbia - Lower Broad River
59. Columbia - Broad River Canal
60. Delete
61. Aiken - Shaws Creek
62. Aiken - Shiloh Springs
63. North Augusta - Savannah River
64. Orangeburg - North Edisto River
65. Camden - Pine Tree Creek
66. Kershaw - Hanging Rock Creek
67. Lugoff W.D. - Lake Wateree
68. Cheraw - Pee Dee River
69. Chesterfield - Thompson Creek
70. Pageland - Big Black Creek
71. Jefferson - Lynches River
72. Delete
73. Charleston, Summerville - Edisto River
74. Charleston - Foster Creek
75. Charleston - Goose Creek Reservoir
76. Beaufort - Jasper Water Auth. - Savannah River
77. Georgetown - International Paper Co. Canal
78. International Paper Co. Canal (Pee Dee River)

II SCHOOLS, CAMPS, PARKS

101. John De La Howe School - Little River
102. Hickory Knob State Park - Clarke Hill Reservoir
103. Clarke Hill Rec. Complex - Clarke Hill Reservoir
104. Columbia Country Club - Lake Columbia - Rice Creek
105. Chattoga Park - Mountain Stream

III INDUSTRIAL

401. La France (Reigel Textile) - Three & Twenty Creek
402. Pendleton Finishing (formerly Excelsior)
403. Duke Lee Steam Generating Station - Saluda River
404. J.P. Stevens Utica Mohawk - Seneca River
405. DeFore Mill - Seneca River
406. Oconee Nuclear Station - Keowee Lake
407. Magnolia Finishing - Buffalo Creek
408. Carlisle Finishing - Broad River
409. Lyman Printing - Middle Tyger River

410. Union Buffalo - Buffalo Creek (Stand-by)
411. Bigelow Sanford (Calhoun Falls) - Rocky River
412. Reigel Textile (Ware Shoals) - Saluda River
413. Clinton Mills - Beards Fork Creek
414. Rowaters Carolina - Catawba River
415. Celanese Fibers (Rock Hill) - Catawba River
416. Lando (Monetta Mills) - Fishing Creek
417. Springs Kershaw - Lynches Creek
418. Springs Fort Mill - Catawba River
419. SCEAC Parr-Broad River
420. General Electric - Saluda River
421. SCEAC McLoekin - Lake Murray
422. SCEAC Wateree - Wateree River
423. SCEAC Beech Island - Savannah River
424. Clearwater Finishing - Little Horse Creek
425. Graniteville Company - Horse Creek
426. Graniteville Company - Bridge Creek
427. Carolina Eastman - Congaree River
428. E.I. Dupont Co. - Wateree River
429. Klopman Mills (Society Hill) - Cedar Creek
430. E.I. Dupont Co. (Florence) - Pee Dee River
431. S.C. Industries - Pee Dee River
432. J.P. Stevens Co. (Delta Finishing Plant, Wallace) - Pee Dee River
433. SCEAC Williams - Back River
434. SCEAC Canadys - Edisto River
435. Amoco Chemicals - Back River

IV FEDERAL INSTALLATIONS

499. Fort Jackson - Gill's Creek
500. Savannah River Plant (AFC) - Savannah River

Ref. 16

Date: 10/06/92

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL

BUREAU OF SOLID & HAZARDOUS WASTE

SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE

THE SURFACEWATER SUPPLIES FOUND BETWEEN LATITUDE 34-15-00 TO 34-22-30 AND LONGITUDE 79-53-09 TO 79-53-58

THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. WATER RESOURCES COMMISSION (02/92).

TREATMENT WORKS NAME		LONGITUDE		PUMP (GPM)
OWNERS IDENTIFICATION	STREAM NAME	LATITUDE	SOURCE ID.	TREATMENT (GPD)
NO SOURCES FOUND.		- - 0		0.0
		- - 0		0.000

SOURCE IDENTIFICATION:

AQ - Aquaculture	IR - Irrigator	PT - Thermo-power	CO - Commerical	MI - Mining
ST - Sewage Treatment	GC - Golf Course	PH - Hydro-power	WS - Public Supply	IN - Industry

S.C. DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL
BUREAU OF SOLID & HAZARDOUS WASTE

SITE BEING EVALUATED NUCOR STEEL, 342226.9 LATITUDE 795359.1 LONGITUDE

THE ENDANGERED SPECIES FOUND WITHIN 4 MILES AND BETWEEN LATITUDE 34-15-00 TO 34-22-30 AND LONGITUDE 79-53-09 TO 79-53-58
THIS REPORT IS BASED UPON DATA PROVIDED BY THE S.C. HERITAGE TRUST FOUNDATION (01/92).

COMMON NAME SCIENTIFIC NAME	STATUS	LONGITUDE LATITUDE	DISTANCE FROM SITE	GRANK SRANK	DATE ADDED	TOPO MAP / COUNTY WHERE THE SPECIES IS LOCATED
WHITE-WICKY <i>ON Black Creek</i> KALMIA CUNEATA	NC/CU	79-51-58 34-22-18	1.94 Miles ESE	G3 S1	08/01/08	DARLINGTON Darlington
VIRGINIA QUILLWORT ISOETES VIRGINICA	CU	79-52-20 34-22-08	1.62 Miles ESE	G1G2Q S1	10/18/41	DARLINGTON Darlington
SARVIS HOLLY ILEX AMELANCHIER	UN	79-52-20 34-22-08	1.62 Miles ESE	G3G4 S3	01/01/78	DARLINGTON Darlington

GRANK/SRANK - Nature Conservancy rating:

- G1 - Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction.
- G2 - Imperiled globally because of rarity or factor(s) making it vulnerable.
- G3 - Either very rare throughout its range or found locally in a restricted range, or having factors making it vulnerable.
- G4 - Apparently secure globally, though it may be rare in parts of its range.
- G5 - Demonstrably secure globally, though it may be rare in parts of its range.
- S1 - Critically imperiled state-wide because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation.
- S2 - Imperiled state-wide because of rarity or factor(s) making it vulnerable.
- S3 - Rare or uncommon in state.
- S4 - Apparently secure in state.
- S5 - Demonstrably secure in state.

STATUS - Legal status:

- FE - Federal Endangered
- FT - Federal Threatened
- NC - Of Concern, National (plants)
- RC - Of Concern, Regional (plants)
- SE - State Endangered (animals)
- ST - State Threatened (animals)
- SC - Of Concern, State (animals)
- SL - Of Concern, State (plants)
- SX - State Extirpated
- CU - Candidate (Federal review)
- UN - Undetermined

nucor steel

A Division of NUCOR Corporation

P.O. Box 525 Darlington, South Carolina 29532 Telephone 803/393-5841

Ref. 17

January 31, 1992

RECEIVED

FEB 10 1992

Moseley
Bureau of Solid and Hazardous Waste
DHEC
Bull Street
Columbia, S. C. 29201

S. C. Dept. of Health & Environmental
Control-Bureau of Solid & Hazardous
Waste Management

Dear Mr. Moseley:

As requested, the purpose of this letter is to clarify some of the correspondence between Nucor Steel and the S. C. Bureau of Solid and Hazardous Waste Department concerning IWP-208.

I will start with the grease/dirt mixture generated from the rolling mills and the associated concrete ponds. The rolling mills use grease for lubrication of the rolling equipment. A recirculating water system services the rolling mills and consists of a supply water pond and pipe lines leading to the mills, and water canals under the mills to collect "spent" water which lead to a 40' sump. Water is pumped from the supply water pond to sprays directed on the rolling equipment for cooling. The water, along with dirt, mill scale, and grease residue falls into the canals and is gravity fed to the 40' sump. The mill scale settles in the 40' sump. The grease residue and the water is pumped from the sump into a concrete bay with dikes arranged to form a baffle system where some portion of the grease residue settles. The water and remaining grease residue then goes back into the supply water pond completing the cycle. Mill scale is removed from the 40' sump every couple of days using a clam shell bucket. Every six months during scheduled shut down periods the supply water pond and grease residue is emptied through a pipe to a concrete holding pond which is relatively close in proximity to the current landfill sight. Please refer to the enclosed drawing for the relative location and layout of this system.

In several previous letters I mention that mill scale could be used as a binding agent if deemed necessary. This was first offered as a suggestion by Jimmy Kelly Jr. of the Pee Dee office. Mill scale has not been necessary in the disposal of this waste as it dries to the consistency of packed dirt once removed from the holding pond.

Secondly, I would like to provide information on the refractory materials we would like to landfill that were tested using TCLP analysis. Each of the materials was tested in their "virgin" form. Molten steel and slag are the only other items that come in contact with the refractories. As the refractories wear or become dissolved in the molten steel and slag they are constantly exposing or providing a "fresh" working surface. All molten steel and slag is emptied from refractory lined vessels prior to repair or replacement. Thus the working surface on "spent" refractories is essentially composed of the refractory itself and no other materials.

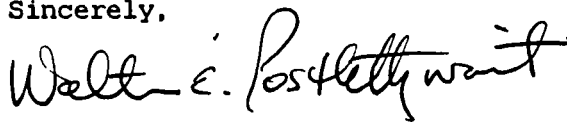
Ref. Moseley to Fitchett
Part 1 (IWP-208)

32

XG

I hope this information helps in the understanding of the grease/dirt mixture from the rolling mills and associated concrete ponds, and the suitability of the tests performed on the refractories. Please do not hesitate to contact me if you desire any additional information.

Sincerely,

A handwritten signature in cursive script, reading "Walter E. Postlethwait". The signature is written in dark ink and is positioned above the printed name.

Walter E. Postlethwait
Chief Metallurgist

cc: Tom Leydic

Ref. 20

SITE NAME: Nucor Steel
EPA ID NUMBER: SCD 044 940 369

RECORD OF COMMUNICATION

☒ Phone Call
☐ Discussion
☐ Field Trip
☐ Conference
☐ Other (Specify)

TO: Nucor Steel File

FROM: Donna Sightler

DATE: November 4, 1992

TIME: 10:35

SUBJECT: Summary of Conversation with Shelly Sherritt of SCDHEC in the permitting section regarding RCRA status.

SUMMARY OF COMMUNICATION:

Shelly Sherritt told me that Nucor was listed as a TSD facility. That they were only listed as a generator. They did file for Part A, just as a protector. But they were withdrawn in September 8, 1992.

CONCLUSIONS, ACTIONS TAKEN OR REQUIRED:

INFORMATION COPIES TO:

File

r-16-91

FedEx 1076-1106-1

Ref. 24

Attn: Neon Steel

Hwy. 52, 16 miles

N of Darlington

Route 55

2953

APRIL GRUNSKY

SOLID-WASTE PERMITTING

BUREAU OF SOLID WASTE

SOUTH CAROLINA DHEC

2600 BULL ST.

COLUMBIA SC 29201

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S.C. DEPT. OF HEALTH

ENVIRONMENTAL CONTROL

Bureau of Solid & Hazardous

Waste Management

DEAR MS GRUNSKY

ENCLOSED IS A TOPOGRAPHICAL MAP SHOWING PRESENT
ELEVATIONS OF OUR LANDFILL.

THE ELEVATIONS OF THE LANDFILL WHEN CLOSED WILL BE
APPROXIMATELY 105 FEET & THE LANDFILL SHOULD BE
ABLE TO REMAIN OPEN FOR APPROXIMATELY ANOTHER
10 YEARS



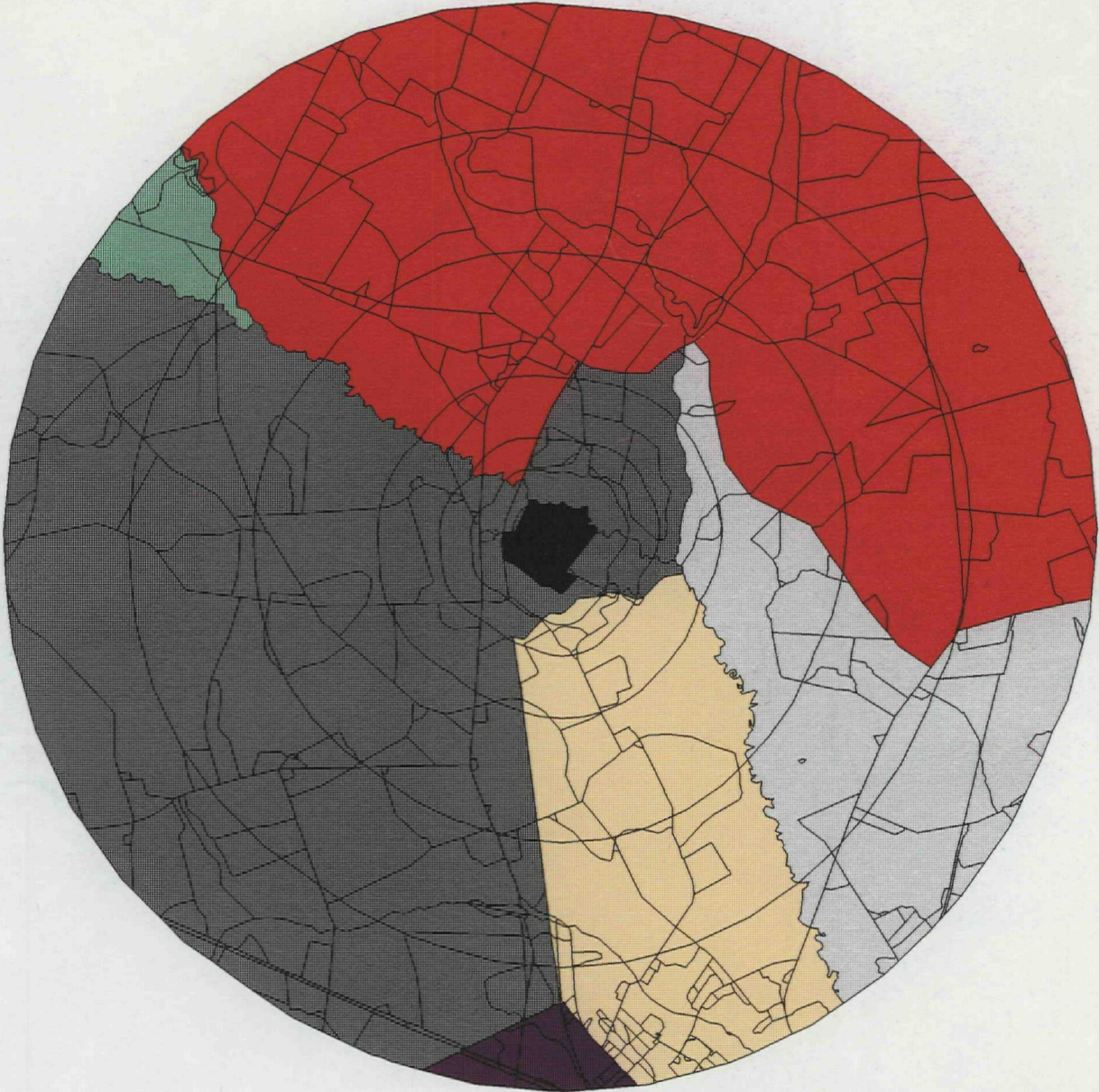
HOWARD W. PETRIE

SAFETY COORDINATOR

393-5841



NUCOR STEEL
SCD 044 940 369
Darlington County



Population estimates within given range of miles:

3 to 4 miles = 3823

.5 to 1 mile = 261

2 to 3 miles = 845

.25 to .5 miles = 115

1 to 2 miles = 1019

0 to .25 miles = 59

total = 6122

MEMORANDUM

Date: June 17, 1992

To: Susan Snook
Site Engineering and Screening
Bureau of Solid & Hazardous Waste

From: Patrick Horton
Info. Coordination Group
EQC Administration

Re: The method for calculating population estimates for
CERCLA sites.

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S. C. Dept. of Health & Environmental
Control-Bureau of Solid & Hazardous
Waste Management

1.) The XY coordinates (UTM) for each site are entered into EQC's Geographic Information System (GIS). The coordinates are taken from USGS 7.5 minute topographic quadrangles.

2.) Each site is buffered at 1/4, 1/2, 1, 2, 3, and 4 mile increments.

3.) Population per square meter (PPSM) is computed to allow the ratioing of population to area. This provides a closer estimate of the population for each range (i.e., 2 to 3 miles).

$$\text{PPSM} = 1 / \text{Area}$$

4.) Buffers and 1990 Census block group data are joined to determine which blocks fall in each range. Each census block has a population value.

New blocks are created when original blocks are bisected with a buffer. However, each new block will keep the same population as the original block. Therefore, population must be ratioed with area.

5.) Estimated population is calculated by multiplying the new block area (created in step 4) and then multiplying that value to the original (old) population.

$$\text{Estimated population} = \text{New block area} * \text{PPSM} * \text{Old population}$$

WELL CHARACTERISTICS: PUMP CHARACTERISTICS:
DEPTH (FT)..... 435 HORSEPOWER..... 60.00
TYPE.....3 TYPE.....T
CASING DIAM. (IN).....10 YIELD (GPM)..... 480
CASING TYPE.....S AVG. DAILY PROD. (TGD) 448.30
UNDER DIRECT INFLUENCE OF SURFACE WATER..... REGULATED CAP. (TGD).. 460.08

TREATMENT CODES:
C7401,D4030,F1430,F3440,Z3801

GROUND WATER SOURCES INVENTORY
3 1610001 DARLINGTON, CITY OF SOURCE ID G16104 3 LAST UPDATE 05/03/91
DESCRIPTION 1...HWY 52 BYPASS AVAILABILITY CODE.....P
DESCRIPTION 2...WELL FOUR LATITUDE.....341654
RECEIVING PLANT LONGITUDE.....0795239
PLANT ID..... SOURCE CODE.....G

WELL CHARACTERISTICS: PUMP CHARACTERISTICS:
DEPTH (FT)..... 600 HORSEPOWER..... 60.00
TYPE.....3 TYPE.....T
CASING DIAM. (IN).....12 YIELD (GPM)..... 480
CASING TYPE.....S AVG. DAILY PROD. (TGD) 504.20
UNDER DIRECT INFLUENCE OF SURFACE WATER..... REGULATED CAP. (TGD).. 480.00

TREATMENT CODES:
C7401,D4030,F1430,F3440,Z3801

GROUND WATER SOURCES INVENTORY
3 1610001 DARLINGTON, CITY OF SOURCE ID G16104 3 LAST UPDATE 07/20/92
DESCRIPTION 1...HWY 52 BYPASS AVAILABILITY CODE.....P
DESCRIPTION 2...WELL FOUR LATITUDE.....341654
RECEIVING PLANT LONGITUDE.....0795239
PLANT ID..... SOURCE CODE.....G
WELL CHARACTERISTICS: PUMP CHARACTERISTICS:
DEPTH (FT)..... 600 HORSEPOWER..... 60.00
TYPE.....3 TYPE.....T
CASING DIAM. (IN).....12 YIELD (GPM)..... 480
CASING TYPE.....S AVG. DAILY PROD. (TGD) 504.20
UNDER DIRECT INFLUENCE OF SURFACE WATER..... REGULATED CAP. (TGD).. 480.00

TREATMENT CODES:
C7401,D4010,Z3801